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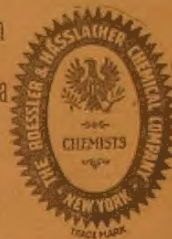
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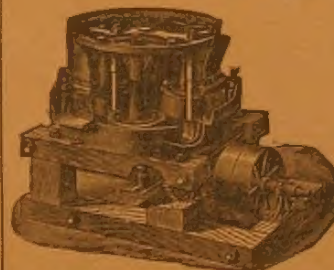
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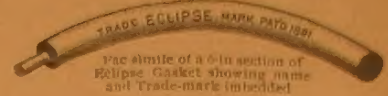
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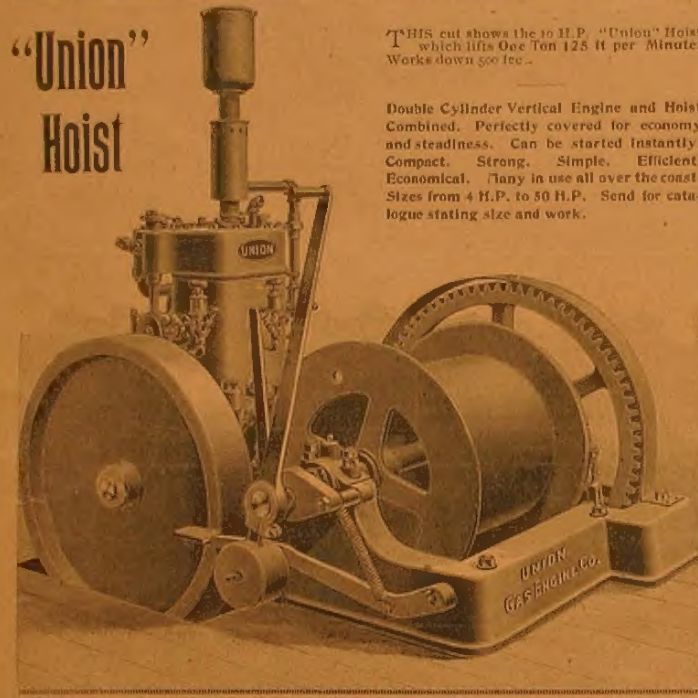
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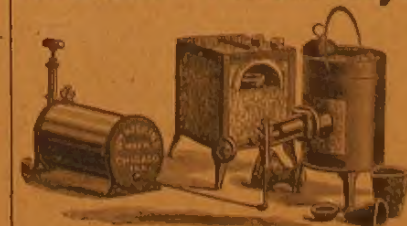
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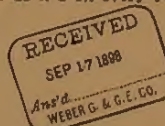
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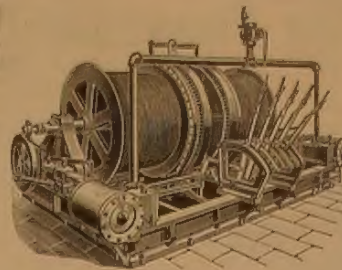
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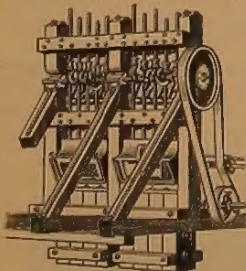
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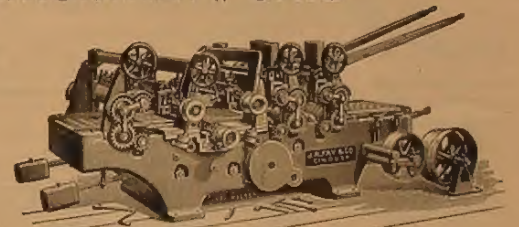
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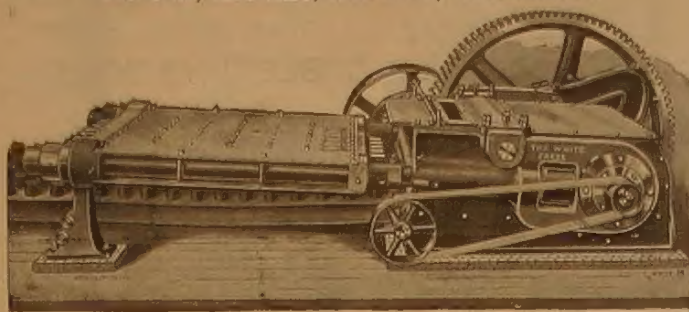
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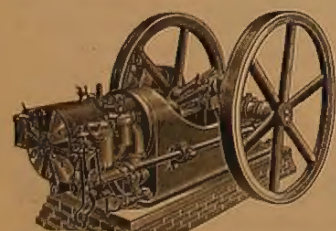
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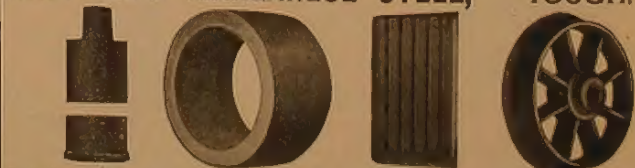
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MINERS' CONVENTION.

It was expected at the date of our last issue that a preliminary meeting of the miners of Southern California would be held in the early part of March looking to the formation of a Southern California Branch of the California Miners' Association. But it being fully intended that there should be, even at this proposed preliminary convention, a representative from every mining district in Southern California, and finding the time named too soon to accomplish this, it was deemed best by the leading spirits of the movement to postpone the meeting to a later date.

Definite arrangements have been made for holding a general convention at the Los Angeles Chamber of Commerce on Saturday evening, April 29th, to which it is earnestly desired that every section should be represented.

It would be to the interest of the mining fraternity of Southern California for all districts and mining camps to hold meetings to elect and send delegates to the convention, which it is desired shall be as thoroughly representative of the mining interests of this section as possible.

This is the most opportune time for the delegates to the convention to come provided with characteristic specimens properly named and marked of the ores of their district, to be placed in the collection of the Chamber of Commerce of Los Angeles. It would then present an excellent means of advertising your mineral resources in the building where this and future meetings are likely to be held.

MILLING CUSTOM ORES.

This is a branch of the mining industry that requires regulating for, in most cases under the present system, no sampling is done before milling the ore so as to ascertain value. The ore is run through the mill and the

owner has to take results as reported amount saved. The amount in the concentrates is not in all cases reported or paid for, and the amount lost in the tailings, be it large or small, is not reported at all. To the small mine owner, developing a prospect and shipping to a custom mill a small amount of ore, to ascertain milling value or obtain a little funds to help out development, if the ore is low grade the results are too often sure to be less than was expected, even allowing for a return only of 85 per cent of its original value. On that account, the returns made by custom mills ought to show

1st. Original value of ore as sampled before milling.

2nd. Amount of gold saved in battery and amount saved on plates.

3rd. Value and amount of concentrates, if any.

4th. Sampled value of tailings.

The above or similar form of returns ought to be furnished to mine owners patronizing custom mills. The occasion for writing on this subject is the result of recent complaints from small mine owners who have had the above experience to discourage them. The milling of sample lots of ore from small mines and prospects is at present conducted in an unsatisfactory and unbusinesslike manner, greatly to the injury of those who own the prospects or mines, and also to the manufacturers of milling machinery for such ores. It is better for mine owners to pay higher freight rates and ship their ore to such sampling and testing mills as make a specialty of such work. In this regard those operating custom mills ought to consult the wishes of owners in furnishing all data possible.

FOREIGN EXHIBITIONS.

The benefits to be derived from extended trade is the chief reason why such "World Fairs" as the Paris Exposition ought to be made the occasion of having the natural resources and manufactures of this country well represented. As a means of attracting capital to invest in the mining industry, such an occasion cannot be neglected, or the State which does so will suffer a loss in consequence.

Recent events in the Orient and Pacific have opened up an outlet for trade in all American products to such an extent that the trade center of the United States has already or will soon be located still further west. On this account the great natural resources of the Pacific Coast States have acquired an increased value and importance. The mining activity of the past year has received a competitor for distinction in trade expansion and industrial development of our neglected resources in the western coast States. The construction of new railway lines has already been commenced and will have to keep pace with the onward march of progress.

For these reasons, the Paris Exposition of 1900 offers the best opportunity for the Western States to present to the capital of the world seeking investment an exhibit which will command attention and admiration, and divert trade and capital to this section.

TRUSTS AND THEIR EFFECT.

There is a degree of prosperity in the country. The manufacture and sale of metallic products are in volume unusually large. The increased demand for them is a result of a long period of depression, in which extreme economy was practiced in their consumption.

and of the needs of the war in which the country has been engaged.

The healthfulness of our foreign commerce has also stimulated energy, and our financial condition has been strengthened by comfortable balances of trade in our favor. Activity of trade has increased the earnings of the transportation companies, and the steadier markets and higher prices for agricultural products have given greater impetus to farming. There has also been a lowering of interest rates which renders the burdens of debtors less onerous.

But concomitant to all this is a growth of the tendency to monopoly and the formation of trusts, and through the buoyant spirit which has been created in the country, the idea of absorbing in the hands of mammoth combinations production and distribution of the essentials of life has become dangerously prevalent. Assuming that through control of production and distribution large profits on investments will be certain, capitalization of trusts is fictitious and excessive. Plants and stocks of individuals are taken in at enormous over-valuation, and accounted as cash capital, in other words, trusts are loaded and inflated with nominal capital. The effect will necessarily be inflated expectations of profits.

Competition will not be encountered, for to destroy it is the object of trusts. Yet, inflated capital and expectations are infallible precursors of panics. The object being wicked, the management of trusts is likely to be extravagant and dishonest. When one of them goes down, its failure will have a far-reaching effect, as it will lead to suspicion of the insolvency of all others. When they begin to tumble, confidence will be shaken from the center to the circumference of business.

The abuses which trusts will surely commit are bound to produce intense popular hostility, and, in consequence, their liability to fail will be immensely enhanced. Their methods will be resisted and their solvency questioned. In fact, it is quite impossible to create confidence in that which is based upon sordid motives. The most permanent of enterprises, industrial or mercantile, are those which are conducted upon fair and honest theories.

It will be the first effort of trusts to create artificial prosperity—in order to enhance their earnings and the value of their stocks. It is rare that they issue obligations secured by hypothecation of their properties. Indeed, except their plants, they have no immovable property to mortgage. They commonly resort to the issuance of debentures, for the payment of which their assets are liable. When conditions become panicky, trusts will be less stable than those enterprises which are conducted in the old way. They will flourish so long as there is prosperity; but, as soon as they cease paying dividends, they will encounter the dissatisfaction of stockholders besides the suspicions and hostility of the public.

Failure of a great trust will be like a fire in a great city which is difficult to control, and results in a conflagration throughout a large area. Trusts, therefore, are objectionable not alone because they strive to lessen the cost of production through the employment of less human labor or the reduction of wages and the raising of prices to consumers, but they are dangerous to business stability on account of their liability to failure, and when one of them fails it produces a crash of no ordinary dimensions.

It is stated as a statistical fact that trusts

already control sixty-five per cent of the business of the country exclusive of agriculture and transportation, and they are still reaching out after more, and when they begin to fail, it will be like an immense earthquake. The dominance of trusts cannot continue in this enlightened country, the people are too-spirited to submit to it.

REDUCED RAILWAY RATES.

The Santa Fe Railway has taken a wise step in reducing the local passenger rates on the desert section of its line from San Bernardino to the Needles. This action will have the result of stimulating prospecting on this part of the line and eventually result in increased business in freight and ores, which will more than compensate for the reduction made to passengers. The prosperous camp of Randsburg, Cal., on a branch of this company's line is an object lesson of what the desert section is capable of producing and other good mining camps are sure to follow the efforts of intelligent prospecting, both to the north and south of the Santa Fe Railway line on the desert. This company is the only railway line that takes any interest in the mining development adjacent to its line, and miners ought to patronise it in preference to others.

BLOW-PIPE ANALYSIS.

The ever-increasing development of the mineral resources of the States has naturally attracted a number of men who are daily exploring unknown ground in search of the precious metals. Many of them are old prospectors, but many more are enterprising adventurers, to whom the prizes to be won in the gold fields are always an attraction.

It is for the latter class that this article is principally intended, and its scope does not pretend to be more than enough to enable a man of average intelligence, with the fewest and simplest of appliances, to determine the presence or absence in a sample of ore under examination of gold, silver, copper and lead. He should also be able to determine by comparing the results of his assays with the whole amount tested, the comparative richness of the ore. He should remember however, that for anything like exact quantitative work with a blow-pipe, months of study and laboratory work are necessary.

The common blow-pipe is a curved conical tube of metal, usually brass, terminating in an orifice as large as a fine needle; simple as it is, if well made, it will be found to answer fairly well. The danger of moisture collecting in the ordinary tube and blown into the flame is materially lessened by cutting the tube in two, about one-third the way from the small end, inserting an ordinary cork in the large end of the large piece, making a hole in the cork, and inserting the freshly-cut end of the small piece of tube in the cork.

The chemical blow-pipe is similar to the common blow-pipe in principle, except that it has a chamber near the end, which collects the condensed moisture.

Where possible, one should have the chemical blow-pipe, but where it cannot be obtained, or becomes injured in any manner, a contrivance similar to the one above-described, affords a fair substitute.

After obtaining a blow-pipe, the beginner must spend a few hours in learning the proper method of blowing. His object will be to maintain a steady or uninterrupted stream of

air from the jet several minutes at a time. This is not so difficult as would appear at first. Distend the cheeks and breathe slowly through the nose for some time, keeping the cheeks inflated and the mouth shut. When one can accomplish this readily, the mouth-piece may be applied to the lips, and the operation repeated without attempting to blow, or do more than keep the mouth full of air. As the air flows out through the blow-pipe, the cheeks fall together and must be again distended, without interrupting the flow of air through the tube. To accomplish this shut the communication between the mouth and lungs by the palate and inhale through the nose. No energy should be wasted in hard blowing, for the beginner will soon see that the stream of air may be maintained with scarcely more force than is supplied by the natural tendency of the inflated cheeks to collapse.

Where obtainable, gas is the most convenient combustible for the blow-pipe flame, but rape-seed oil in a lamp, with large round wick, is the best for general use, as it can be packed in small compass and weighs but little. Candles may also be used when no better material is at hand, and of these high-grade stearin are the best, for paraffin candles, although giving a higher heat, are apt to soften in warm weather. In some instances even tallow candles will answer, but they require constant snuffing.

In an ordinary flame, as from a lamp or candle, the combustion only takes place on the outer rim of the flame. When a stream of air is blown into it from the blow-pipe, however, the combustion that takes place in the interior is more complete, and an intense heat is produced. When the beginner can maintain a steady stream of air for several minutes, he should seat himself at a table with his arm resting on the edge, and the lamp lighted and trimmed, so as to produce a full, steady, but not a smoky flame, slightly to the left of his face. He should then hold the blow-pipe lightly between the thumb and first and second fingers of the right hand, and direct the jet or small end, to the edge of the flame just above the wick. By regulating the blowing, a steady flame should be produced, which will be regular and conical, if the jet be well shaped.

When the lamp burns, the oil sucked up by the wick is vaporized. These vapors unite with the oxygen in the air and burn on the outer edge of the flame, forming a hot coat. As the oxygen does not penetrate inside this coat, the vapors within are highly heated out of contact with the air, and any metallic oxide placed within it, will when hot tend to part with its oxygen to the carbon and hydrocarbon of the flame. This flame is known in blow-pipe analysis as "reducing flame," abbreviated to "R. F." By holding the blow-pipe just outside the flame, and deflecting the whole flame by a gentle blast, so regulated that it retains its yellow color and is luminous, the reducing flame is produced with a blow-pipe. No soot should be deposited upon the assay, and only the extremity of the luminous part should envelop it.

The other flame used in blow-pipe analysis is the "oxidizing flame," abbreviated "O. F.," and the manner of producing it with the blow-pipe is by inserting the jet somewhat into the flame, the blast made a little stronger and the carbon more completely consumed. The inner blue cone of the flame is sharply defined, and is surrounded by a nearly colorless envelope, at the extremity of which metals may be intensely heated in contact with

the air, and rapidly oxidized. No luminous streaks should be allowed to appear in the flame, and assay should be kept as far from the blue point of the flame as is consistent with a temperature high enough for rapid oxidation.

Before passing from the subject of the flame it must be remembered that the heat is most intense at the tip of the blue cone just referred to, and this is used to test the fusibility of substances without regard to chemical action.

For the purpose of this article, but five methods of supporting the assay, or "supports," as they are technically termed, may be considered—charcoal, platinum, wire and forceps, open and closed glass tubes. Charcoal should be made from bass wood, pine or willow, and should be of even texture and cut into rectangular blocks from one to three inches in width, the same in thickness, and not to exceed six inches in length. The assay should be placed either on a flat surface, or in a cavity prepared for it at right angles to the rings of growth.

When an excavation is made for the reception of the assay it should be cup shaped, shallow, smooth and regular. This may be effected by picking a hole in the charcoal with a knife and revolving in it the rounded end of the agate pestle.

Platinum wire is used for supporting beads made from fluxes. The size known as No. 27 Jewelers' hole $12\frac{1}{4}$ is best. It should be cut in pieces three inches long and a loop made in one end. Care should be taken that the loop is not too large, especially when a candle is used. After using the wire the looped end should be thrust in a bottle of sulphuric acid, and before using they should be rinsed with water and thoroughly cleansed.

Platinum forceps can be readily made by any jeweler from elastic brass wire, the tips being made of platinum wire, welded on, for holding splinters of substances in the flame to ascertain their fusibility and the color imparted to the flame.

Open Tubes—A piece of straight glass tubing about three inches long, not exceeding a quarter of an inch in diameter and slightly bent one-third the way from one end. This slight angle help to prevent the assay from falling out.

Closed Tubes—A closed tube may be readily made by heating an open tube (six inches long) in the middle and drawing it out. Thus two closed tubes three inches long are formed.

In addition to the above-named articles a certain amount of accessory apparatus is necessary, including an agate pestle and mortar to be used in reducing ores to a fine powder, but it should be used for grinding only, never for pounding hard bodies;

A four-ounce hammer;

A small rectangular block of hardened steel to be used as an anvil. On this, after first wrapping them in stout paper, the harder ores may be pounded into pieces of suitable size for grinding in the agate mortar;

A dozen test tubes of hardened glass of standard size (six inches long);

Substances used to produce chemical changes in bodies by which they are recognized, are known as re-agents or fluxes. But small quantities are needed, and it is best to purchase them from responsible druggists, so as to be sure of their purity. Those most commonly employed and the only one necessary to be mentioned in this article are sodium carbonate, hereafter spoken of as soda, bi-

borate of soda, or borax, and phosphate of soda, and ammonia, or microcosmic salt.

Two ounces of soda will be ample to have on hand at a time, and it should be kept in a glass-stoppered bottle, so as not to absorb moisture from the air.

The same quantity of commercial borax is sufficient and is ordinarily pure enough, but it is always best to heat a loop of platinum wire, dip it in the borax and fuse it to a bead in "R. F." and then heat it in the "O. F.," examine the bead when hot and when cold, after heating in each flame, and if the bead remains perfectly colorless and transparent the borax is pure. Ammonia or microcosmic salts should be pure. One ounce is all that is necessary, and it, like borax and soda, should be kept in a tightly stoppered bottle and labeled.

Two ounces each of the following acids (all in glass stoppered bottles):

Concentrated sulphuric acid.

Concentrated nitric acid.

Concentrated hydrochloric acid.

Pure or "test" lead must also be purchased. Eight ounces will be sufficient. Two ounces of pure silver in a sheet is also necessary.

About eight ounces finely pulverized bone ash for making cupels, as will be hereafter explained, must be bought.

(To be Continued.)

CORRESPONDENCE

ARIZONA.

(From our Special Correspondent.)

CHLORIDE, ARIZ., March 2, '99.

A number of mining sales have been made in this district within the past few weeks, the principal one being the Mollie Gibson. The sale amounted to \$8,000, and it is considered by all who know it to be many times less than its actual worth. The "Mollie" has considerable under-ground workings, and much high grade silver ore has been taken out of them, but the principal and most important discovery ever made upon it since its location and work was made only a few weeks ago. This was at the bottom of an eighty-foot shaft, when the workmen broke into a large body of native wire and ruby silver. The new discovery created a great sensation in the district and surrounding territory, and many flocked to see it. It was found to be fully as rich as reported, and the discovery has given a great stimulus to other mining and prospecting.

Another sale has been made of two claims belonging to J. C. Snickard and Chas. Gross. These were merely prospects, but showed up some really valuable ore. It is rather a bond and lease instead of a sale, but a large per cent of the purchase money, which was away up in the thousands, was paid down, and the opinion prevails that the sale is as good as made.

Another sale is one which is favorable for a deal, the Golconda, belonging to E. F. Thompson, of Kingman, and Mrs. Mary B. Smith, of Mineral Park. The mine is a gold producer, and a four-foot body of gold ore is shown in the breast of the 125-foot tunnel. Formerly the Golconda was a shipping mine, but some litigation in the matter of administration upon the death of Mr. Smith ensued, and the property lay idle for more than two years. Two months ago, however, matters were so nearly straightened out that a lease was given and some work done, which

opened up this last fine body of ore. The property has never been handled by thorough and practical mining men, and now that a sale is about to be made, which, consummated, will place a large force of men at work, and this mine again become a steady producer and shipper.

Kean St. Charles, after six years of propelling the destinies of *Our Mineral Wealth*, at Kingman, as editor, has given up the paste pot and scissors to Mr. J. C. Doan, of Los Angeles, Cal., and substituted the hammer and drill for the shooting stick and mallet, and is now engaged in having his fine Mid-night gold mine developed, looking to make of it a steady and lasting producer. He has now, it is estimated, 1,500 tons of free-milling gold quartz on the dump, that averages \$15 to the ton, but it is for the driving of the tunnel straight into the mountain which, he believes, will strike or uncover some very high grade ore that Mr. St. Charles is after, and from the statements of those who are acquainted with the mine and the present character of the ores, that he will attain to the highest success.

Work all round is getting more plentiful, and the ensuing spring and summer promise much activity in all the working mines and known prospects. JACOB MITCHELL.

CALIFORNIA.

Southern California Miners' Association.

EDITOR JOURNAL:—The movement which is now on foot to establish a Southern California Miners' Association, which is to be a branch of the State Association, is of the utmost importance. For many years the State Association has labored in the interests and general welfare of that which pertains to mining. The labor of revising our mining laws, the protection of mineral lands and watersheds, etc., has been borne by them, and we of the south, with the exception of a few individual cases, have allowed them to do it, and have extended no aid to them in their efforts to build up the mining industry.

Mining in Southern California has now grown to such magnitude that to protect our own interests and for the general welfare of our section it is now a necessity to further advance mining by the formation of such an association—to be made up of a representative membership from all counties south of Tehachapi. Conditions are different here from those of the North, and unless we can make our wants known through such an organization, we cannot expect to be heard. We have the material upon which to build a large membership. Let those at all interested in mining signify their intention of becoming members, and when the call for a meeting shall have been made, let us hope every county will send a large number of representatives to attend and organize The Southern California Miners Association.

Very Truly,

LEW E. AUBURY, E. M.

MASSACHUSETTS.

(From our Special Correspondent.)

BOSTON, March 4th, 1899.

EDITOR JOURNAL:—Since our last letter there has been something of a slump in the local market, but at the present writing the market shows great strength, and we believe the upward tendency in price will continue for months to come. At the same time we

would urge conservatism in the investment of money in new enterprises unless it can be clearly demonstrated that these companies can produce copper at a profit at ten cents per pound. We believe this will be the ruling price for copper inside one year. Investors should also note the amount of capital reserved for the treasury of these new companies, as it will be impossible to carry on successful copper mining in competition with the Standard Oil people without all modern improvements and the ability to go through lean periods without calling for assessments.

Among the stocks which we consider due for a rise in the near future are Centennial, Allouez, Rhode Island, Victoria, Santa Fe and Mass. Consolidated.

Of the new companies which are about to be floated in Boston, we recommend The Great Lakes Copper Company. We understand that this company will be incorporated under Michigan laws, with a capital of 100,000 shares, par value \$25.00, and that the subscription price will be \$10.00. An even half million dollars will be placed in the treasury. This company owns about 2000 acres of rich mineral land in the Province of Ontario, about 35 miles N. E. of Sudbury. The camp is in the Wahnapiatae district, where the Rockefellers are operating on a large scale. The ore is a rich sulphide of copper carrying some gold and silver, and is an ideal smelting proposition.

ROBERT S. BICKFORD, Stock Broker,
60 State St., Boston.

The Diamond Drill and Its Work.

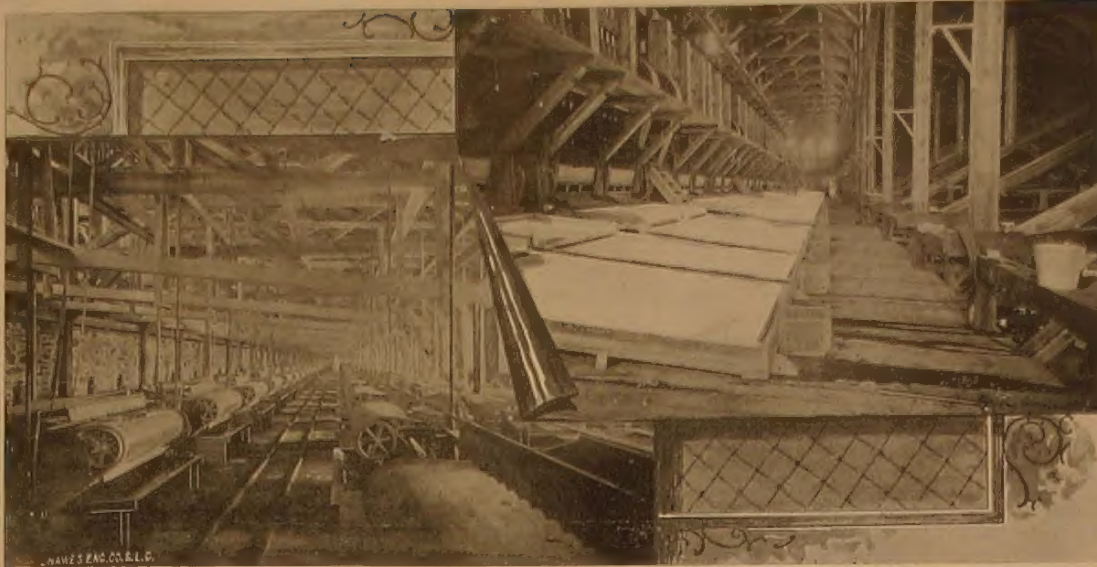
The American Diamond Rock Drill Co. of New York have issued a catalogue entitled *The Diamond Drill and its Work*. The book gives a general review of the work accomplished with a diamond drill, a general description of drills; the special features of their drills, etc., and contains a fund of valuable information. A copy of the work will be mailed to those interested upon application.

Link Belt Machinery.

The Detroit Sprocket Chain Co. (Ltd.) of Detroit, Michigan, have just issued their Catalogue No. 3 of general chains, detachable link belting and other elevating and conveying appliances. The pamphlet is well written and elegantly illustrated, contains 132 pages. A compilation of mechanical information accompanies the matter contained in the catalogue.

Calumet & Hecla.

The report is current in the copper country that the Calumet & Hecla is going to cease sinking and adding new levels and will confine its efforts to the stoping of ground already opened. As the report goes the company has enough ground opened to keep them busy for ten or twelve years, and they will rush production while copper is selling at high prices. The bulls probably have been too enthusiastic in crediting the mine having enough territory opened to last a dozen years without opening new ground. Calumet sends out not far from 2,000,000 tons of rock annually. Multiply this by 12 and it gives a total that means considerable in the way of cubic feet of ground. There is no question but that the company could increase its output considerable for the coming few years if it cared to do so, but its policy has generally been a conservative one.—*Iron Ore*.



INTERIOR VIEW OF NEW 140 STAMP MILL, ERECTED FOR JOHN S. MILLER IN THE FALL PART OF 1896.

THE MINING SECTIONS OF MONTANA.

Between the auriferous and argentiferous ore-bearing districts in Montana, one can travel from eighty to 100 miles in various directions and keep within the bounds of mineral belts. In consequence of the large area and the multitude of excellent prospects and mines worthy of mention, space forbids more than a brief review of the properties particularly notable on account of their output and showing.

Although the first explored in the state, Madison county's mines contain a wealth, at present the least developed, that will demand the brawn and brain of generation to come.

Granite county has been known for years as a silver producer, second to no other part of the earth,—the Granite Mountain Mining Co. alone having paid over \$12,000,000 in dividends while the Bi-Metallic, Hope, Trout and many others have been successfully worked and paid handsome returns to their owners.

As rich a field for the legitimate exploration and development of the chief industry of the great Northwestern country as Jefferson county, is hard to find, especially is this true of the districts immediately surrounding the little town of Basin. Late years have developed this county wonderfully, and a smile greets the visitor everywhere he may find himself within the county lines.

In a previous issue the JOURNAL gave a

short description of mines and mills working in Jefferson county, but nothing was said of the great Diamond Hill property in the St. Louis district. This great property was purchased by John S. Miller in 1895. There is but little history connected with the mine. As early as 1866 the placer ground at St. Louis and down Indian creek were discovered and worked for over twenty years yielding nearly \$5,000,000 in gold. Indian creek heads in the Elkhorn range of the Rockies

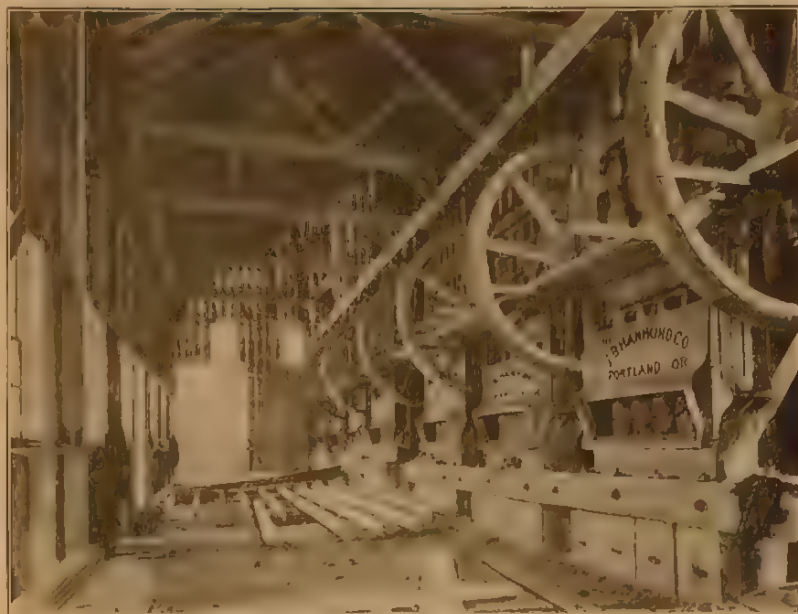
and flows into the Missouri near Townsend. Diamond Hill is about half a mile above St. Louis. Below that hill there was good placer ground until it was worked out, for some five miles down to the canyon of the creek; and below the canyon on the high plateau is an enormous stretch of placer ground which has been worked for over a quarter of a century and is still worked two or three months of the year, which is as long as water can be had. Now there is no placer gold found above Diamond Hill in any of the gulches. This proves to the practical miner that the Diamond Hill veins are the mother lode from which the gold found along Indian Creek has been ground up and distributed in ancient geological times.

This Zone of precious metals now known to be from 200 to 300 feet in width and more than 2,000 feet long, containing several million tons of oxidized ore, the greater portion of which will pay a profit to mine and mill and a very large portion of which will average \$10.00 per ton in free gold, besides the sulphurettes, that are contained in the ore. No one can say to what depth this oxidized ore may go.

A mill of 140 stamps was erected by Mr. Miller on the Diamond Hill property in 1896.



VIEW DIAMOND HILL, MINE, OLD AND NEW MILLS.



INTERIOR VIEW OF OLD DIAMOND HILL 40 STAMP MILL, BEFORE COMPLETION.

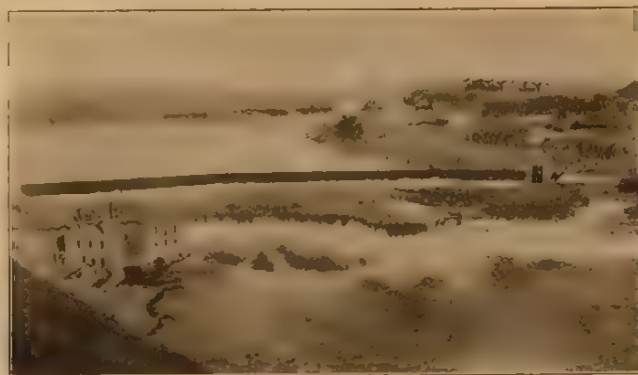
The plant is one of the most complete and perfect in that section of the country, is fitted with concentrators and other modern gold saving devices. The mill has a working capacity of 1000 tons per day. Ore can be mined and milled for about \$1.50. The power utilized to run the mill is water. All the improvements about the plant are most substantial and first-class. The property was equipped with a five-stamp mill, which did good service, until a 40-stamp battery was erected, proving the value of the ground, and causing the management to operate on a more extensive scale, by building the 140 stamp mill above referred to.

The mining sections of Fergus county are in the Moccasin, Judith and Belt ranges. The former two lying within ten miles of each other and the formation being similar in character. The ores varying considerably in both sections, there being free milling gold and silver ores, sulphides, lead, copper, iron and zinc. The general formation in the Judith and Moccasin is lime, porphyry, slate, quartzite, shale, micaceous granite and gneiss. The principal leads so far discovered are contact veins with limestone footwalls and porphyry hanging walls, though some few free milling gold leads have been discovered between porphyry and blue quartzite. Blanket leads are common and characterize some of the best properties.

Although Cascade county is one of the small counties of the state, containing as it does only 2,600 square miles and a population not exceeding 25,000, it is nevertheless one of the most important. It certainly gives promise at some future date of containing one of the largest cities of the Northwest. The principal mining sections lie in the immediate vicinity of Belt and Sand Coulee. Though Belt was very little known prior to the spring of 1894, its coal banks had been worked more or less for nearly twenty years. The vein of coal now being worked is known to exist for a distance of forty miles.

In speaking of Lewis and Clarke county,

the great gold bearing Unionville district, where is located the celebrated Whitlatch-Union mine, which produced in the 70's several million dollars, and which is yet a great

BLACK EAGLE FALLS NEAR GREAT FALLS, CASCADE COUNTY, MONTANA
THE HOME OF THE BOSTON & MONTANA SMELTER.

proposition. West of Helena is the town of Rimini, a silver camp almost exclusively, which has yielded millions of dollars in silver. Tributary to Rimini is the Cataract district, which has within its borders one of the richest mines in the state. In a previous article the JOURNAL spoke of sections of this county and it is unnecessary to make any further remarks here.

Speaking generally, Flathead county is certain to rank as a mineral producing county. Along McDonald creek north and east of MacDonald lake, veins of copper-silver ore have been discovered, which have attracted capital. Crossing northward to

the Helena Board of Trade had the following to say: "The statement that Helena has tributary to it the greatest mineral bearing zone than any other city of Montana is easy of proof.

Within a radius of 25 miles of Helena are some of the greatest gold and silver producers in the state.

South of the city is

the North Fork of the Flathead river one may find scores of copper claim locations in the mountains that skirt that stream. To the west of Flathead valley is the famous Montana-Kootenay region, in which considerable work has been accomplished.

Missoula county adjoining Idaho and especially that rich district known the world over, the Coeur d'Alenes must of necessity contain much mineral, although as yet but little attention has been given to the mineral industry except in a few instances and it would seem that the success thus attained would have a stimulating influence on those interested in mining. The principal mining district of the county is the southwestern portion along the line of the Coeur d'Alene branch of railway. This county is the only county in the state producing antimony.

The principal business centre of Park county is Livingstone, which is geographically located to command the trade of a rich territory immediately surrounding it. About 80 miles from Livingstone is the Cooke City, which has been considered one of the most extensive mineral zones in the state, but progress has been retarded by the lack of any railway facilities by which to bring the ores to market.

One of the chief industries of Gallatin county is the coal measures found in 1867 near Bozeman and which have since developed into considerable magnitude. While it is a well known fact, that gold, silver, iron and copper lie hidden beneath the surface in this county, but little has so far been done to open up the prospects already discovered. Whether from the fact that the lodes found are not valuable enough, or, that the finances of the prospector were inadequate to go ahead and work them the writer is unable to state.

Beaverhead county's principal industry is mining, which is carried on to a considerable extent. A good deal of attention is being given to the copper district east of Dillon. The Birch Creek Camp also near Dillon is a steady producer of gold, silver and copper. Bannock which always has been a prosperous camp, was more active during the past year than for some time. Several large dredging plants were constructed to work the placers which proved to be a success, and gave satisfaction to those interested in work-



LEONARD SHAFT ONE OF THE PROPERTIES OF THE BOSTON & MONTANA CO.

ing on such an extensive scale. Leasers are employing a large number of men working the quartz claims located in the vicinity of Dillon or, in fact, all over the county.

Deer Lodge county has been made famous the world over by having within its confines one of the largest smelting and copper refining plants in the world—the Anaconda, which consists of the Upper Works, Lower Works, converters, electrolytic refinery, foundry and brick yards. At the Upper Works between 700 and 800 men are employed, at the Lower Works 1400, at the converter plant 350; at the refinery 100; at the foundry 300;

tremely rich mines have been discovered and worked. The principal mining districts of Deer Lodge county are known as Granite, Butte, Poorman, Bald Butte, Elliston, Ontario, Elk Creek, Coloma, Gold Creek, Pioneer, Blue Eyed Nellie, Georgetown and Zozel. In these districts there are stamp mills with batteries of from 250 to 300 stamps.

The remaining counties of Montana are Custer, Yellowstone, Valley, Ravalli, Carbon and Sweet Grass, with very little if any mineral developed within them.

Doubtless rich fields await the prospector in this great section of the state of Montana.

low and hence the crude methods of reduction in vogue up to within a decade, prevented any extensive development.

The discovery of immense bodies of low grade ore in Cripple Creek 7 years ago started a competition among metallurgists for cheaper processes, including cyanide and chlorination. Improved methods of concentration were also employed and the new Wifley and Woodbury tables are the result.

Pyritic Smelting, while not particularly new, having been conducted with varying success for more than ten years past, has also been greatly improved over the original "Aus



at the brick yards 50; making a grand total of between 2,900 and 3,000 men with a monthly pay roll of over \$250,000. In the works throughout no expense has been spared in placing the most approved machinery and methods in operation, and the magnitude of the plant cannot by any possibility be realized by one who has not personally visited and spent at least a week in examining its wonders. Of the minerals of Deer Lodge county the chief is gold with copper closely following.

At the extreme north and south ends of the county gold is found in large and paying quantities. In the southern part some ex-

WARD SMELTER.

DENVER, COLO., Mar. 9, '99.

Ward district, Boulder county, Colorado, is one of the older mining sections of the state, the first discoveries of gold being in the early '60's. But the fact that only the surface was free milling stuff and that the oxidation ceased at a comparatively shallow depth varying from 20 to 50 feet and was succeeded by a sulphide that yielded scarcely any values in ordinary milling, caused most of the prospectors who drifted in to leave for other fields. The general grade of the ore in the district is

tin" process. The modifications introduced by various metallurgists within the past 5 years have taken the system out of the realm of an experimental process and pyritic smelting, in its best phases is readily accepted as an economical dressing of low-grade ores carrying iron and copper particularly adapted to the class running high in sulphur, the combustible qualities of which are largely utilized in this concentration by fire.

The cut shown herewith illustrates the Ward Pyritic Smelting Co.'s plant, one of the newer modifications of this class of Smelting. The matte is formed either on a 3 per cent.

copper base or iron as may be expedient according to the character of the ore dressed. The inventor of this process, Mr. J. S. Loder, has been a persistent experimenter along these lines for many years.

The Loder pyritic smelter differs materially from all others in mechanical construction. The heating chamber through which cold air is forced under high pressure and heated before entering the smelting furnace, is water jacketed and an economizer of fuel. The furnace has a double tier of tuyeres and double issue portals one on either side, out of which slag and matte begin to flow in a continuous stream (no plugging) within one and a half hours after charging.

The matte and slag flow together in water jacketed cars which remain stationary, the pure slag running off into a conduit leading into the creek. The matte containing the mineral values is drawn off into another car and cooled ready for shipment to the refinery. While it is not practical to give at this time a detailed technical description of the principles involved and methods employed, it may not be amiss to state some of the practical results attained and their effect upon the development of the mineral resources of the immediate section.

An examination of the view given of the smelter and site will show what is known locally as Saw mill hill. The smelter was located late last fall at this particular point on account of the proximity of heavy mineral veins, which with development promise a heavy production.

About one-half mile east of the smelter, Col. Wesley Brainerd, local manager of the Chicago Colorado Mining Company, which has large holdings of mineral lands in the vicinity, has opened in this hill a mine known as the Moltke lode from which very high grade silver-ore has been shipped, but which closed down, when silver was demonetized. Several thousand feet of work have been done and a very strong vein exposed. West of the Moltke, the Leviathan tunnel now in about 200 feet has cut into the same formation, which at this point is intersected by Ajolo belt, the silver values being nominal.

The railroad, as will be seen by reference to the illustration, cuts across the face of the hill and the line of the tunnel. In doing the grading for the construction of the road bed a heavy quartz vein several feet wide running from \$25 to \$30 a ton, was cut, which will be tapped by the Leviathan tunnel within the next 100 feet. A heavy net work of veins has been located on surface so that while the tunnel is a crosscut for about 150 feet a large amount of territory will be opened for exploitation with the progress of the work. The owners have been encouraged not only by the location and performance of the Moltke, but by the excellent grade of ore, to let some large contracts for development and believe they can market a grade of ore being but a few hundred feet from the smelter, that under ordinary circumstances could not be profitably produced. The smelter people have a parallel tunnel, the portal of which is practically at the door of the smelter which will cut the same vein system as the Leviathan. Across the gulch north they have also secured another property carrying a high per cent. of low grade iron, which is being developed this winter, while the smelter is shut down on account of the snow blockade, which prevents the moving of ore from the mines.

South of the smelter, less than a half mile, a fine strike of good ore has been made in the Puzzler in a cross-cut 600 feet in from the

portal of the tunnel. Ore running as high as 10 ozs. in gold, has also been found in the Ward Rose shaft one-half mile southeast of this. Rose properties prove that with development Puzzler and Saw Mill hill (in reality the same mountain) will furnish higher grade ores than any other portion of Ward district. Owing to the heavy snows shortly after the smelter blew in but a short run was possible before the snow shut down all resources of ore supply. With the opening of the season however, the Colorado and Northwestern Railway which is just emerging from its first snows of 9,000 feet and upwards, plans an aggressive campaign of protection in the way of snow sheds and fences and will build switches to all of the producing mines so that an abundant supply of ore may be assured to the smelter when it again blows in. In addition to the smelter, there are several mills with concentrators in successful operation and from the present outlook Ward will in 1899 see by far the liveliest season and heavier production that it has yet experienced. The great Adit tunnel which cuts the Mammoth Dew Drop vein longitudinally for a distance of over 1200 feet, 300 feet below surface, can alone furnish, when transportation facilities are afforded ample low grade iron ore to keep two such smelters in operation. With a single season's run to demonstrate beyond cavil the value of the Loder process, it is not at all improbable that at least one more and of much larger capacity will be erected within the district.

The fact that the smelter buys ore on the same schedule that the smelters pay and can take small lots at a time if no more is offered will give a great stimulus to prospectors and small miners whose limited capital and meager development prevent large shipments. The treatment charge makes it possible to market certain classes of ore, whose gold and silver content does not exceed \$6. The active development in progress and projected all over Ward district within the past year is ample proof that the day of waiting for capital to come in and buy prospect holes has passed and the erstwhile prospector has under the stimulus of new and more economic methods of treatment become the practical operator who believes in developing his property as a business proposition.

P. A. LEONARD.

Miscellaneous Mining News.

ARIZONA.

James A. Fleming, president of the Black Warrior Copper Company, has contracted with the Colorado Iron Works at Denver, to furnish all the machinery for a leaching plant of 200 tons of ore capacity per day. The machinery will weigh all told about 100 tons, says the *Silver Belt*.

It consists partly of a 100 horse power Corliss engine, two 50 horse power marine boilers, one large Blake crusher, two sets of rolls that weigh 16,000 pounds each, an air compressor, several lead-lined steel tanks and eighteen tons of twelve-pound T rails.

The leaching plant is designed throughout by Mr. Fleming and is unlike anything now in use. The whole process is automatic and managed when in operation with four men for 200 tons per day. Mr. Fleming has applied for a patent on his process.

On the Montgomery claim, one of the claims owned by the Black Warrior Company, they have a depth of thirty-five feet of ore and

have not struck the hanging wall yet. The ore averages about 17 per cent copper. This ore ledge at the surface, 300 feet above, is fifty feet wide, out of which 1000 tons have been shipped from the grass roots that averaged over 14 per cent.

The Metallic Accident mine, Mohave Co., which was worked for its rich silver ores, is now found to carry thirty per cent of copper. The discovery was made this week and preparations are now being made to operate the mine on an extensive scale.

CALIFORNIA.

AMADOR COUNTY.

The Emerson shaft of the Wildman-Mahoney properties at Sutter creek is now down a little over four hundred feet, with work progressing as rapidly as possible. The new reservoir is completed, and 4000 feet of water pipe is in, completing their system for water power throughout the property. They are having trouble with water, however, for they are compelled to shut down part of their plant part of the time on account of its shortage.

About sixteen men are at work in the Esperanza, near Mokelumne Hill. At present operations are being confined to the 1000-foot level, where drifting in the ledge is being prosecuted. The ledge matter is being tested in the mill, ten stamps of which are operated constantly.—*Amador Ledger*.

CALAVERAS COUNTY.

Grading for the new mill at the Gwin still continues. Two Burleigh machines are being used, and when the rock is broken it is moved by the hydraulic process, a sixteen-inch pipe having been laid from the tank for that purpose.

J. Burton, representing eastern capital, who is at present operating the Green Mountain hydraulic mine in Chili gulch, has commenced operations on French Hill. A shaft has been sunk to a depth of seventy-five feet, from the bottom of which a drift has been run about fourteen feet and good gravel encountered.

EL DORADO COUNTY.

The German mine below El Dorado is now being rapidly developed. A ten-stamp mill has been running for some time and the results have been so encouraging that the company is now adding ten stamps to its crushing capacity.

The sluice boxes of the Blue Rock mine at Georgia Slide, owned by Raw, Fredericks and others, were recently robbed.

A five-stamp mill is being erected on the quartz mine operated by F. Thomas & Co., near Gold Hill.

INYO COUNTY.

The mines in Tuber canon in the Panamint country are proving their excellence. The Montgomerys have milled the dump, all that came out of two deep shafts, one of them nearly 400 feet in depth, and it all averaged \$26 per ton. This is a wonderful showing. They are now milling the croppings, and it all pays. This mine will prove one of the best in the country. Phoebe & Co., of San Francisco, who hold a bond on the property, will make the biggest mistake of their lives if they don't take it in.—*Inyo Register*.

KERN COUNTY.

The *Randsburg Miner* publishes an exhaustive and well written article, February 18th, regarding the 30-stamp mill of the Yellow Aster Mining Co., at Randsburg, in which it says:

"The crowning feature of the whole is the steam power and electric plant. The two immense boilers are either of them capable of generating sufficient power to drive the whole plant, equipped with duplicate pumps, injectors and heaters, so as to prevent a possibility of an entire break down from that source. The fuel used is crude petroleum, which flows to the burners by gravity from a large 30,000 gallon tank above the mill. There are also duplicate pumps for feeding petroleum in case of heavier oils.

The St. Elmo.

This famous mine which created so much excitement in the early days of the camp, and from which so many fine specimens have been taken, is now being worked again. It has lain idle for many months and the reason why is not clear. From its location, and the mine itself indicates it, if there is a mine in the camp that goes down it ought to be the St. Elmo.

The Johannesburg Reduction Works has taken a lease for one year on the mine and have put on a force of men under the management of Wythe Walker, and are taking out ore. Their lease requires that they sink a number of feet each month in addition to drifting and stopping. The work will be carried forward carefully and systematically and the St. Elmo may yet justify the highest opinion once prevalent in this camp in regard to it.

LOS ANGELES COUNTY.

Work is steadily pushed on the Red Rover mine at Acton. A \$1,500 bar of gold bullion was brought into Los Angeles from a run of 125 tons of ore in January last, and shipments of a similar size have since been made. The one above mentioned was not the first cleanup made in January, but the third. The shaft is to be straightened throughout the entire present depth and levels will be established every 100 feet; the shaft to be sunk to the 1000-foot mark. A new hoist is to be placed on the property and the mill enlarged to twenty-five stamps instead of ten.

The stockholders in the company are Senator Stephen M. White, Governor Gage, Judge Erskine M. Ross, Geo. J. Denis, R. B. Carpenter, E. B. Millar, Schroder & Johnson and H. O. Collins, with George J. Denis president, and H. O. Collins secretary.

SAN BERNARDINO COUNTY.

The St. George mine at Vanderbilt is becoming one of the best gold mines on the desert. The property was falsely represented to the bonanza kings, Flood and Mackay, who bought it some years ago for \$50,000, and dropped it after expending nearly as much more upon it. A G. Campbell, the present owner, has developed a ten-foot vein of base ore running from \$20 to \$40 a ton at a depth of 175 feet.

TUOLUMNE COUNTY.

At the Mazeppa mine, near Stent, the shaft is now down 185 feet and they continue to hoist ore, liberally sprinkled with free gold, from the bottom. At the annual meeting of

this company, which was held in San Francisco, February 16th, some changes in the directorate were made. C. R. Bishop, who is one of the sugar magnates of the Hawaiian Islands, was chosen a director and vice president of the company. Geo. L. Bishop was chosen a director and elected treasurer. Regarding the rumor current that a 10-stamp mill was to be erected at once, Superintendent Pease states that there is no truth in it. The company purposes opening up the property thoroughly first, necessary funds for this purpose having been provided.

At the Excelsior mine, above Confidence, three shifts are being worked. Development is being pushed day and night.

Work on the new 20-stamp mill for the Brown Mining Co. at Tuttle town, is progressing rapidly and satisfactorily.

The additional ten stamps being put in at the Black Oak mill, Soulsbyville, are ready to commence operations. At this mine a canvas plant is now being erected.

Chas. E. Shaffer has sold his interest in the Crystalline group of mines located adjoining the Rawhide properties to a Scotch syndicate for \$300,000. The property is well developed by tunnels and open cuts. Active work has been carried on for the past few years.

COLORADO.

Around Idaho Springs.

John Bunt made a shipment of some good smelting ore from his Harrisburg mine near the Freeland, Idaho Springs, Clear Creek Co.

Noble & Co. made a shipment of 125 sacks from the Lamartine.

A carload of air pipes for the Wilcox tunnel arrived. It is now being put in place and the work of driving the tunnel ahead will be prosecuted vigorously.

A. E. Simpson made a fine shipment from the Little Albert, close to the Donaldson, netting over \$180. Value mostly in gold.

A strike of fine ore was made in the Main Trunk by A. Chiodi. Ten inches of solid iron and copper ore, besides a large streak of mill dirt.

A fine streak of good ore was opened up in the Gem Extension mine on the first level, the walls of the vein are now twenty feet apart and all the dirt taken from between goes to the mill except a streak of about one foot on the hanging wall, which is worth perhaps \$100 per ton.

The Hudson mine in Virginia canyon is to be started up. A new shafthouse will be built and a new plant of machinery will be put in place immediately. This mine years ago produced some very good ore. It is one of the group of the Idalia Tunnel Company which flourished here some years since. M. M. Pomeroy as president. The tunnel was driven several hundred feet in and then abandoned, and for the last ten years has lain dormant. It is very gratifying to note the different old properties in the camp that are being started up this season. It surely indicates a season of prosperity for Idaho Springs.

Granite Active.

Work was temporarily suspended on the Belmont, at Granite, Chaffee county, preparatory to the deciding of where is the best point to sink and other matters which have to be

taken into consideration before commencing aggressive development.

The Monte Cristo has about twenty feet of its upraise done, leaving forty feet more to be accomplished before connecting with the shaft. The face of the upraise shows a good body of ore of about six feet in width and streaked with several stringers of hard ore. A shoot is being constructed and everything conducive to economical handling of ore is being carefully considered. When connections are made the shaft will be about 230 feet deep, and the present work will be the means of exposing a fair quantity of ore, as the shoot has been explored 100 feet east from the 170-foot level.

George Lewis and O. Johnson are still pegging away on the New Strike and are liable to strike a good body of ore at any time. The indications point that way and they have the positive knowledge that it is ahead of them, so that the question simply resolves itself into one of getting ahead as rapidly as possible.

One of the most important strikes made in Hinsdale county lately was made on the Clara L. A tunnel had been driven on a parallel with the vein, striking a barren spot. A shot being put into the vein to give more room for the car to pass, broke down the barren rock and disclosed mineral resembling the ore taken from the famous Golden Fleece. Specks of peetzite are sprinkled all through the vein, and sample assays run as high as 81 ounces in gold to the ton. The Clara L. is located on Buckley hill, directly opposite to the Golden Fleece mine. It is owned by Messrs. O. E. Oliver, Wm. Fuller and F. M. Miller. A few months ago Wm. Lawton, one of the owners of the Clara L. at that time, found it a very difficult matter to dispose of a half interest for \$300.

The management of the Tom Thumb mine is now freighting out to Wolcott, Colorado, a carload of good grade carbonate lead ore to be shipped to Denver.

The Elkhorn mine, in Whiskey Park, has been compelled to shut down, owing to the depth of snow rendering it impossible to get in wood for fuel for the engine. They have left exposed in their bottom drift a nice body of ore.

IDAHO.

At this season of the year we hear very little of placer mining and of the extensive work that will be done in the Florence basin next summer. The Florence Dredging company, with a capital of \$500,000, divided into 1,000 shares of \$500 each, with R. Gordon Wood as secretary, are already making inquiries as to lumber for the coming season.

The officers of this company are: J. H. Myer, president; H. S. Blair, vice-president; W. H. Picking, treasurer; R. Gordon Wood, secretary; R. C. Beard, superintendent.

This company has been formed and incorporated under the laws of the state of Idaho, for the purpose of mining for gold by the method of dredging, and the particular field of operation chosen is Florence, Idaho county, where, thirty years ago, many large fortunes in gold dust and nuggets were secured with comparatively little exertion. This camp is credited by the government reports with producing in the neighborhood of \$1,000,000 worth of placer gold.

NICHOLAN

1840

The American Consolidated Mining company purchased the claims in 1904 and estimated during 1905 that it would give about 100,000 pounds of refined copper. The total cost of producing copper, including transportation, was \$8.50 a ton, and the net earnings were \$5.00 a ton. About \$1,000,000 was spent in construction. The company has a balance of assets of \$25,000.

Wolverine

The Wolcott Copper Mining company is declared a dividend of \$2.50 payable April 1st to holders of stock of March 1st. The mine is producing from 150 to 200 tons of metal running 8 percent metal per month. It is at 80 cents under 8 cents per pound and at the present price of the metal it is making 100 cents a ton. It is evidently building up a surplus with which to construct a new stamp mill. Wolcott figures remarkably well at the present price of its shares. It is not capitalized as high as its shares are, the new mining it is well equipped and has a rich lode. Copper country people predict \$20 per share before next time.

MINNESOTA.

An announcement made early last week means much to Duluth in an industrial way. It was the fact that the blast furnace at West Duluth, had been leased to a company that would own it up to the near future for the manufacture of pig iron, and it is said that the intention is to turn pig out to the mill majority of the furnace.

The institution is on a ten-turnage but it has been operated with a double shift, so that 120 tons have been turned out in the course of a day.

The plant passed into the hands of the bondholders last fall by an order from the United States court. For several years it has been idle, but it is known as an excellent furnace, and as soon as the new lessees can get it in shape the work of converting ore from the Mesabi range in a Duluth blast furnace will be a reality. This is something that many of Duluth's lost friends have long claimed could be successfully done here, and it is said that the people that have taken hold of this proposition are abundantly able to make a success of the venture. *Duluth News Tribune*

Scramble Mine

It begins to look as though the Scramble mine, a low grade proposition that is said to equal the Hammond Reef or Abee A. of Duluth, is about to be put under development.

W. M. Strong, an American mining engineer, life manager of the Poley mine, is now on the property making an exhaustive examination for prospective purchasers believed to be an English syndicate. The property is said to be a good one, and as it is only about seven miles from Rat Portage, it worked on a large scale, as it should be to make it profitable, it will be of great benefit to the labor and business interests of the district.

MISSOURI.

The Ball Land and Mining Co., southeast of the Rubber Neck pump shaft have developed a wonderful lead prospect at 80 feet, and if they had sufficient water could clean up 10,000 pounds a shift. In half a shift they

[illegible]

MONTANA

A large body of ore has just been encountered in the Gilt mine, a place where it is expected to be permitted. Superintendent Nostrand has this week conceived the plan of crossing cutting the ground to the west from the big mine, and about a half mile the top of the mine, says the Nostrand *Heard*. "Here was about six feet of ground which had never held a pick, tuck, mallet, and everything went to show that there must be ore in that direction."

The main vein followed by the wire above dipped to the west, but in the bottom of the wire the vein was flat. It was ascertained below that what was supposed to be the main vein was to the east, and upon this theory Mr. N. shut expected to find ore between the vein and the wire produced. The ore, of course, was not in fact where it was expected, and while several openings were made in the drifts, but could get out of this ore without having reached the main vein. This is a very thick, like body of ore, and being as it does, it is without doubt the main vein of the Galt, which the former operators were unable to find or follow. Mr. Nathan brings our congratulations upon this recent coup, which itself ought to make the stockholders wealthy.

NEVADA

Pumping Water from Comstock Mines.

That the Kison pump is a success was demonstrated beyond doubt February 26th. Supt. Kerwin and Manager McMillan Ross descended to the 1700 foot level of the Gould & Curry shaft, and at about two p. m. water was turned into the pump, and without hitch of any kind was sent through pipes to the Sutor tunnel under a 600 pound pressure. The water was reduced in the shaft at the rate of a foot a minute, the stream running through the Sutor tunnel like a millrace. A steady pressure was maintained at the 1700 foot level. No leak was discovered in the entire pipe. Great enthusiasm prevails there over the success of the pumping plant and it is regarded as the turning point for a new era on the Comstock.

NEW MEXICO

Output of Hillsboro Mines

Wicks	20
K. K.	35
Richmond	35
Snake Group	55
Opportunity	20
Sherman	5
Cincinnati	10
Trippe	55
Res. silver lead	5
Eureka	10
Freiburg	10
Total	250

Total output since January 1, 1899 2,569.
—*Hillsboro Advocate*

ORIGIN

SOUTH DAKOTA

UTM11

1000 West of Park City resumed operations on the 1st with 135 men in the place of Shuperts of Highgate, and will continue at once and be continued for five or six concentrating and will be placed in a mine soon to handle the low grade ores in a few days. A beam splitter ordered for the Deerpark of England is soon expected and will be at the top of the mill at the mill at Daisey near a. Meaur is being increased to 20 tons daily.

The Cox or Main or Merit is reported in the Southern and improved government progress. It is reported there are new take over on the Georgia and Springs. A very large number of people have been arrested from the Horns of more than one. The Northern, Humber, and up and it is doubtful if it will ever get up for the first of May until the prices sack the high grade ones. So far as the locking out of very large ones or milling one continues without interfering South Western Silver Creek declared a dividend five cents per share.

WASHINGTON

Three consignment men, the Second Regiment Fire B Co. have been received for treatment at the Northampton. The man owned by Finch & Campbell of Spokane, for the consignment had customs valuation \$2,000, or \$41.20 per ton.

The Republic Mining and Improvement Co. is working a force of men on its group of claims adjoining the town of Republic. The group consists of the Jesse Wasp and one other claim and a shaft is being sunk on the

big quartz showing. Thos. Coulan, Capt. Miller and H. L. Lillenthal are heavily interested in the company.

The San Juan shaft is now down nearly 40 feet and the ore has widened so as to take in the entire shaft. Ore bins are being built to receive the assorted ore.—*Miner and Electrician*

FOREIGN MINING NEWS

BRITISH COLUMBIA.

The recent strike in the True Blue has widened out until there is now three feet of ore in sight.

A fine chute of ore is said to have been uncovered in the lower tunnel of the Adams claim, one of the Canadian group just above the Ruth mine at Sandon last week.—*Kootenaiian*.

MEXICO.

The fact of the anthracite coal fields being opened up by the Southern Pacific Co., in Sonora, Mexico, 100 miles east of Ortis Station, in the western part of Altar district, points to the possibility of a new road for Sonora, and give the Pacific Coast a connection with points of Western Mexico other than by water.

Richard M. Rich recently found a valuable vein of ore four feet wide near the line of the Rio Grande, Sierra Madre and Pacific railroad. The ore runs 50 ounces of silver and 30 per cent copper to the ton.

It is reported that an English company has offered \$3,000,000 gold for the Esperanza mine near El Oro.

Some rich veins of copper ore have been discovered near Carretas, not far from Chihuahua city. The ore assays 12 to 37 per cent copper.

Thirty bars of silver, valued at \$30,000, arrived at Chihuahua from the Cusihiuiriachic mines. There is also 40 tons of ore valued at \$700 each ton at the station ready for shipment to the Juarez smelter.—*Mexican Financier*.

Pedro Prieto has leased for a term of years the Dolores mine in the Santa Eulalia district, to a Kansas City syndicate. The mine is producing a gross income of \$40,000 worth of ore weekly, and Señor Prieto under the lessee has a royalty of twenty per cent of the net profits.

The completion of the Chihuahua and Pacific railroad will give a renewed impetus to the development of the mines in the Guerrero district, many of which have for a long time been on a shipping basis, and many others await the advent of better transportation facilities to get their product to the smelters.

The new owners of the La Reina mine, near Cusihiuiriachic, are getting rich through the big shipments they are making from their property. It is said that the property has already produced a half a million dollars, and the ore bodies are scarcely reached.

Santa Eulalia Mines.

At the present time the principal activities are in the vicinity of Santa Eulalia, one of the famous producing localities in Mexico.

In the early days the Spaniards worked the mines there and they have outputted millions upon millions of silver and lead. Local tradition has it that the largest piece of native silver ever taken from a mine was taken out in the Santa Eulalia mines. The mining, however, was as a rule but little more than surface work, very few shafts of depth having been sunk. To test the question of the existence of ore bodies at greater depths the Chihuahua Mining Company has sunk a shaft to a depth of about 1,000 feet, opening up a large and fine body of ore running from 50 to 100 ounces silver, and from 10 to 15 per cent in lead. The Kansas City Smelting Company is also doing some extensive development in this district, and renewed depth given to the workings of the original Santa Eulalia mine, has resulted in uncovering a vast body of fine smelting ore. Both of these companies are making regular shipments.—*Chihuahua Enterprise*.

Latest Mining Decisions.

Prepared by Andrews & Murdoch, Berrien Springs, Mich.

Gen. St. §2400, requiring the locator to sink a discovery shaft on the lode to show a well-defined crevice, does not require the walls of the veins to be exposed. *Fleming et al. vs. Daley*, 55 Pac. Rep. (Col.) 947.

Where, in a contest over conflicting mining claims, the evidence showed the land belonged to one or the other of the claimants, a charge that, if neither was found to be entitled, neither could recover, was properly refused. *Fleming et al. vs. Daley*, 55 Pac. Rep. (Col.) 947.

A petition by a mine owner under division 5, Comp. St. 1887, for a right to construct a ditch over another's claim, must allege that plaintiff attempted to come to an agreement as required by section 1497, and failed. *Glass et al. vs. Basin Mining & Concentrating Co.*, 55 Pac. Rep. (Mont.) 1047.

Where in contest over a mining claim, the jury was permitted to view the ground, so as to enable them to intelligently consider the evidence they had heard, a charge authorizing them to make independent investigation of their own was properly refused. *Fleming et al. vs. Daley*, 55 Pac. Rep. (Col.) 947.

Where the undisputed evidence shows that, if a vein was discovered at all, it was discovered in a discovery shaft sunk as required by Gen. St. §2400, the court need, not on the issue of discovery confine the question to the discovery shaft, nor define a legal discovery. *Fleming et al. vs. Daley*, 55 Pac. Rep. (Col.) 947.

Evidence that a person who had negotiated the sale of a mining lease agreed to take an interest in it for the commission due him, it not appearing what that interest was, and no part of the lease being assigned to him, is insufficient to show a partnership agreement between the parties. *Caley vs. Coggsell*, 55 Pac. Rep. (Col.) 939.

Comp. St. 1887, div. 5, §1497, authorizing a mine owner to petition for a right to construct a ditch over another's claim if the right "shall not have been acquired by an agreement," requires the mine owner to make an unsuccessful attempt to come to an agreement before filing his petition. *Glass et al. vs. Basin Mining & Concentrating Co.*, 55 Pac. Rep. (Mont.) 1047.

One agreeing to permit another to mine ore in a specified territory, and to pay a certain sum per ton therefor, must permit the mining

of ores remaining in the territory after deliveries of large quantities, which included ores taken outside the territory, amounting to more than the ores remaining in the territory. *Worthington et al. vs. Given*, 24 So. Rep. (Ala.) 739.

Evidence that a miner worked for the owner of a mining lease as a common miner, without exercising any authority or ownership, and without being consulted as to any operations; that the operations were carried on at a loss, which the owner never requested the miner to share, is insufficient to establish a mining partnership between the lease owner and the miner. *Caley vs. Coggsell*, 55 Pac. Rep. (Col.) 939.

One who has located a claim, filed his notice, and procured a survey thereof by the United States deputy surveyor, as required by law, cannot be deprived of his property because the surveyor failed by mistake to include all that was covered by his location notice, where the mistake was cured by a re-survey under the orders of the interior department, within a few days after the owner discovered it. *Basin Mining & Concentrating Co. vs. White*, 55 Pac. Rep. (Mont.) 1049.

Under Rev. St. U. S. §2324, requiring a mining location to be distinctly marked on the ground, so that its boundaries can be readily traced, and all records to contain a description sufficient to identify it; and Pol. Code, §§ 3610, 3612, requiring the locator to post a notice at the point of discovery, giving the length claimed along the vein each way, and its general course, as near as may be, and within ninety days thereafter to file a declaratory statement giving a description of the claim sufficient to identify it, the locator, having posted the notice stating the general course of the vein, may swing his claim in any direction required to include the vein, within ninety days, and this though the notice laid the course to the points of the compass, no bad faith being shown. *Saunders et al. vs. Noble et al.*, 55 Pac. Rep. (Mont.) 1037.

California Antimony.

The price of antimony has recently advanced, partly in sympathy with the general rise in the metal market, and this and a wider and more lively interest in the metal among prospectors and miners promises an increase in the California product. Last year but forty tons were produced in the State, while in former years the amount has been 150 tons. The metal cuts a small figure in the mineral industry of the State, but there are a good many interesting things to be known about it, says the *San Francisco Call*. One thing not generally known is that owing to the metallurgical difficulties of working antimony ores none of the big custom smelters anywhere produce antimony or want anything to do with ores in which it is an element. Penalties are charged for its presence. There are but seven antimony smelters in the world, and the special plants and processes required are used for nothing else. One is in San Francisco, two are in London and there is one each in Japan, France, Austria and New York. The San Francisco smelter is one of San Francisco's unobserved industries. It is a little institution at Ninth and Division streets, operating secret processes and working twenty-four hours a day with twelve men divided into two shifts. During 1898 this smelter produced 300 tons of the commercial metal, the ore coming from Nevada, Utah, Idaho and elsewhere on the coast, California, contributing but forty tons. This product

represents the working of about 600 tons of ore. The ore is stibnite, or sulphide of antimony. Stibnite is found in many counties of the State, but especially in an eight-mile mineral belt in San Benito county, where it is associated with cinnabar, and in Kern county. A good many antimony claims have been located, and there are many listed antimony mines in the State, but only two or three are producing, and that fitfully. Many others are being clung to, exploited and offered for sale, but the peculiarities of antimony mining keep the mine owners from doing much besides wondering why they can't make a little money.

Chemically pure antimony is worth \$3 a pound, or \$6000 a ton, but in its commercial forms its price ranges from 5 to 40 cents. The common form of metallic antimony has risen here from \$.085 to \$.095 since December. The price is made by the Pacific Coast monopoly, the Chapman Smelting Works Company, which regulates its figures by New York and London prices. The Japanese product is the only thorn in its side, and when a shipment from Japan is risked prices are cut and it is announced that no Japanese antimony will be allowed to net anybody a dollar over here. Some time ago ten tons were imported from Japan for sale, and it was sold last week at \$.075. The Chapman Company succeeded three years ago to the plant and the business of the company now operating in New York. A number of interesting things were told about the business the other day by C. Solomon, Jr., the head of the Pacific Coast concern.

"The product of the Coast is yet small," he said. "It supplies the coast demand and leaves some for shipment East. San Francisco consumes about sixty tons a year. It is used by machine shops for Babbitt metal, for chilled shot, by type foundries and stereotypers and for the work of linotype machines. We shipped a carload of sixteen tons to St. Louis the other day, and have sent several carloads there in the past few months. California could and will produce a great deal more, but there is so much about the business that the miners don't understand. There are plenty of antimony mines in the State, but only a few will pay to work, because the ore is not rich enough. We refuse to buy ore that carries less than 40 per cent antimony. Pure stibnite carries 71.4 of antimony and 28.6 of sulphur. Other metals are always in the ore, and working is a costly process. Only forty pounds of ore are used at a charge, and it goes through the fire three times. Our commercially pure product gives this analysis: Antimony, 99.47; arsenic, .132; lead, .042; copper, .015, and iron, .23, together with some other impurities. The smelting processes used are secret, and, of course, not patented. The metallurgical methods of refining antimony are well known, but by following the books the cost would be from \$1 to \$1.50 a pound. The improvements are kept as business secrets. We use the Hallett process used by one of the London smelters, and the Cookson process is used in New York and by the other London firm, the two American firms having secured pupils of the originators of the processes.

"One feature of the business is that the antimony miners are always kicking and thinking they are being robbed. They can't understand some things. They expect returns on the assay value of their ores, as with other ores, but some of the antimony is always lost and antimony ores are always paid for by 'quality and produce' only. Another mys-

tery to them is that they get nothing for the gold and silver in their ores. All the ore we get contain gold and silver, but it is disregarded and thrown away. The ore will carry from \$2 to \$20 a ton in gold and from five to fifty ounces of silver, but it would cost from \$200 to \$300 a ton to get it out. I have received so many kicks about this that I wrote recently to Vivian, Younger & Bond of London to learn their practice, and here you see they say: "We could not make any payment for gold and silver contents, for you are doubtless aware that the problem of separating the precious metals from antimony is one of the most difficult problems of the day and the inventor of any cheap process of doing this would soon make a fortune." Not long ago I offered ore carrying 200 ounces of silver and 40 per cent antimony to a big Denver smelting company and they would not give anything for it. You see, an assay may give a prospector a wrong idea of the value of his claim. The assay may show 50 per cent antimony and \$75 a ton in gold and silver, and he thinks he has a rich find. He gets paid for 5 to 8 per cent less antimony than the assay shows and nothing for his gold and silver and he curses the smelter.

"A California shipper gets about \$12 less for his ore than he could get in New York, but this is the railroad charge to New York. The Kern county ore we get averages 50 per cent of antimony. The miner would receive \$30 a ton f. o. b. at San Francisco. If he is twenty miles from a railroad it will net him, say, \$23 a ton at the mine, which is better than the average gold mine. There are many large deposits running from 15 to 25 per cent, but it does not pay now to work such ore. There is a good market for the ore and many claims need development more than they do a promoter."

That is the California antimony situation and these are the terms and conditions offered by the Pacific Coast monopoly. The leading mine now producing is about twenty miles from Mojave, with an 80 foot shaft, some drifts and 100 tons of ore on the dumps which the owner will not sell just now.

Mining and Prospectors' Guide.

The Los Angeles, Cal., assayers were always considered as energetic and progressive, and have now demonstrated the above to be a fact. The printing and advertising done by them is something wonderful. The latest thing out in printed matter is the *Miners' and Prospectors' Guide*, issued by James Irving & Co., the gold reaners and assayers, located at 128 North Main street. It contains 156 pages and cover, giving a synopsis of the United States mining laws and regulations thereunder; state and territorial mining laws of California and Arizona; valuable information regarding metals, also valuable information to engineers and millmen, etc., etc. The whole is well gotten up and very concise. Send for one.

PERSONAL NEWS ITEMS

GOVERNOR BRADY of Alaska has lately visited Washington, D. C., and in speaking of the boundary question, said serious casualties have occurred in the ruptures between the miners along the line.

CHAS. CADMUS, a mining engineer of Chicago, is in Deadwood, S. Dak., from where he will visit the different camps, as soon as the weather becomes settled.

A. C. COUNTER has recently arrived in Parral, Mexico, from Denver, Colo.

H. B. GOODRICH, M. E., has lately left Chihuahua Mex., for his home in Boston.

J. C. SEPTULVEDA, of San Francisco, Cal., is in Chihuahua, where he expects to engage in mining.

E. B. STANLEY, of H. D. SKINNER Co., of Spokane, Wash., left for Shuman, Mich., a few days ago to look after some mining interests.

RAYMOND G. OSGOOD, a wealthy Klondyker, spent a few days last week in Spokane. From there he went to Seattle.

HARRY SHALLENDERGER and J. F. YOUNG have lately returned to Spokane, Wash., from a two weeks' trip through the Boundary district.

J. G. DENNISTON, proprietor of Denniston's San Francisco Plating Works, was one of the visitors of the JOURNAL the other day.

W. S. WEBB, third Vice President of the New York Central, with a party of thirty-five is in Los Angeles, Cal.

O. A. VANDERCOOK, of San Francisco, has gone to take charge of the mill at the Sheeptrail mine, near Kingman, Ariz.

STIRLING MAHON was lately appointed foreman of the Yellow Aster mine, Randsburg, Cal. He was formerly foreman of the Creston mine, Minas Prietas, Sonora, Mex.

FELIX C. VOGEL, in company with his brother, has lately established a Technical Bureau in the City of Mexico, Mex.

C. LANFORD has lately been making his annual visit of inspection to the Santa Rosalia Mining Company's property in Lower California, of which he is director general.

W. H. JEFFRY, the mining engineer of Roseland, B. C., has lately made an examination of the Rathsmulder mine, Boundary District, B. C.

J. STANLEY MUIR, formerly manager of the Gold and Silver Extraction Co. of America, Denver, Colo., has gone to examine some mining properties at Port Limon, Costa Rica.

C. T. MIXER, of Ishpeming, Mich., has lately returned to Boston from his third trip to Nicaragua. He expects to go to Joplin, Mo., in a few days.

EDWARD L. DUFOURGE, of ALCOTT, FEAN & PEEL, mining engineers, has lately left New York for Peru and Bolivia. He expects to make an extended professional trip in these countries in the interests of a New York syndicate.

J. SLOAT FASSETT, of New York, is in San Francisco on his way to Korea, with men and machinery to work the mining properties conceded by the Korean government.

D. R. PARKER has lately returned to Deadwood, S. D., from the East, where he went to see about his interest in some mining matters.

HENRY SCHMITZEL, who for a number of years conducted the assay office at Lead, S. Dak., has lately taken charge of the office again.

PROFESSOR ROSEBERRY and SPENCER PHILLIPS are in Deadwood looking at the phonolite prospects of the Black Hills, in which he is very much interested.

MR. BARREL, chief assayer for the Galena Mining & Smelting Co., while engaged in crushing ore was struck in the eye by a small bit of rock, totally destroying the sight.

J. F. BIRDSAL, of Spokane, Wash., has returned from examining the Dora mine. He made five assays, ranging from \$5 to \$350 to the ton.

H. M. PORTER, owner of the Snake and Opportunity mines near Hillsboro, N. M., expects to erect another mill in a short time so as to handle the increased output of the mines.

T. D. MORRIS expects to pay a visit to his mines in the Clark mining district, Arizona, in a few days.

M. A. BUCKE, of Kaslo, B. C., has lately left to examine some mining property near Yellowstone Park, Mont.

D. W. KING, ore buyer, arrived in Kaslo, B. C., a few days ago.

F. O. HURD and J. E. RYAN, mining men of Medford, Ore., are in Grant's Pass, Ore., for a few days.

THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

New York, March 14, 1899.

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER	COPPER
Mar. 1	57 1/2	18.00
Mar. 2	57 1/2	18.00
Mar. 3	57 1/2	18.00
Mar. 4	57 1/2	18.00
Mar. 5	57 1/2	18.00
Mar. 6	57 1/2	18.00
Mar. 7	57 1/2	18.00
Mar. 8	57 1/2	18.00
Mar. 9	57 1/2	18.00
Mar. 10	57 1/2	18.00
Mar. 11	57 1/2	18.00
Mar. 12	57 1/2	18.00
Mar. 13	57 1/2	18.00
Mar. 14	57 1/2	18.00

SILVER

The silver market has been quiet, with business done at slightly declining rates. It is to be noted, however, that the price for spot and future have been converging so that March silver has come to a price only a little under metal for prompt shipment.

COPPER

The unusual demand for copper is causing comment all over the world. The latter part of last month the quotations were \$12.60 while today they have reached the remarkable figure of \$16.25. Buyers held off as long as possible and have utilized the stock on hand and are now forced to buy to supply their needs, thereby causing the market to be bullish, and as a matter of consequence the price has gone up. We quote for Lake, \$16.00 at 16% electrolytic in cakes, wirebars

and ingots, \$16.75 @ \$15.87 1/2; cathodes \$15.75. With casting copper at 15.87 1/2 @ \$16.00.

LEAD

A steady increase in the demand for lead has raised the price to \$4.35 with a prospect of it going some higher. There have been considerable quantities of lead withheld from the market with the expectation of securing higher prices, and undoubtedly this will be thrown open, which will cause a reaction and fall in price.

We have to quote \$4.27 1/2 @ \$4.35 New York, and \$4.20 @ \$1.25 for St. Louis.

SPLITER

The demand continues fairly steady but is no longer as brisk as it was during the few preceding months. There is quite a disposition on the part of sellers to meet the demand, the quotation being 5.05 @ 5.10c at St. Louis and 5.20 @ 5.25c at New York.

ANTIMONY

Antimony continues strong, and we quote Cookson's 93c; Hallett's, U. S. St. and Japanese, 91c.

NICKEL

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33 1/2c and 36c per lb and for smaller orders 3 1/2c and 38c.

IRON

Although the London cables reported a serious break at the beginning of the week, prices here have remained fairly steady on account of supplies being rather meagre. We quote the metal at 18.12 1/2 @ 18.2c.

PLATINUM

Prices are now quoted at \$15 and \$16 per oz., New York. The London quotations are 59 @ 60 s per oz. Supplies are not large and prices are firm. For chemical ware, best hammered metal. In lots

of 250 grams or more, 56c per gram; lots of 100 grams or more, 57c per gram; less than 100 grams, 58c. Manufactured platinum will be supplied in same quantities at 2c less per gram.

POTASSIUM CYANIDE

Purified, 98 @ 99 per cent., in cases of 120 lb., at 32c per lb. in 5, 10, 25 and 50 lb. tins at an advance.

The New York quotations are unchanged at \$39.50. The London price is also unchanged at 7 lb. 5s. per bushel, with 7 lb., 4s. named for second ends.

POWDER

F. o. b., San Francisco No. 1, 70 per cent., nitro-glycerine per lb., in earload lots, 17 1/2c; less than one ton, 17 1/2c. No. 1* 60 per cent., earload lots, 13 1/2c; less than one ton, 15 1/2c. No. 1** 50 per cent., earload lots, 11 1/2c; less than one ton, 13 1/2c. No. 2, 40 per cent., earload lots, 10c; less than one ton, 12c. No. 2*, 35 per cent., earload lots, 9 1/2c; less than one ton, 11 1/2c. No. 2** 30 per cent., earload lots, 9c; less than one ton, 11c. Black blasting powder in earload lots, minimum car, 728 kegs, \$1.50 per keg; less earload lots, \$2 per keg.

The trade in coke at St. Louis is reported very quiet—a condition not unusual as the year draws to a close.

IN CAR LOTS, ST. LOUIS

Connellsville fly coke 72-hr. fry No. 10 River, \$4.00 Pocahontas 10 Crushed, 10 Gas works coke, lump, per bushel 1

BORAX

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:

Refined, in earload lots, in barrels 7 1/2c; refined, in earload lots in sacks, 7c; powdered, in earload lots 7c; concentrated, in earload lots 7c.

THE MINOR METALS

Quotations are given below for New York delivery.

Aluminum, refined, per lb.	54c
Antimony, refined, per lb.	91c
Phosphorus, per lb.	40 1/2c
Fluorine, per lb.	20c
Potassium, 4c per cent.	60c

Variations in price depend chiefly on

CHEMICALS

Deliveries on contract are good. Contracts have been taken, particularly for alkali. Much 1899 business has been done in domestic caustic soda, and as low as \$1.30 f. o. b. works is reported as the contract price.

CAUSTIC SODA

Quotations for caustic soda domestic high test are \$1.40 @ 1.45 per hundred lbs.

ALKALI

Domestic, 54 per cent., 56c, 64, 57c, for eign 55c, 64, 60c, from dock as to style of package.

CARBONATED SODA ASH

54 per cent., 90c and 95c per 100 lbs. basis 48 per cent.

RECARBONATE OF SODA

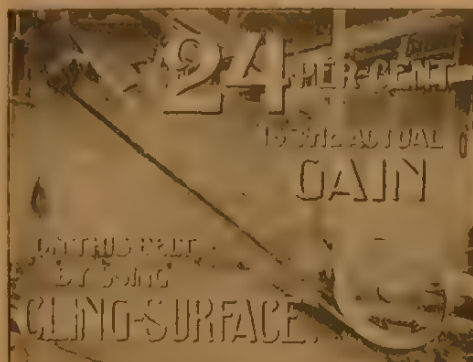
English, \$2.12 1/2 @ \$2.25 per 100 lb. American, bulk \$1.25 and \$1.50 per 100 lbs. according to brand.

SODIUM

For domestic, 50c, per 100 lb., less usual discounts; English, 65c @ 67 1/2c. Concentrated, sal soda, \$1.60 @ \$1.65 per 100 lbs.

CHLORIDE OF POTASH

Chlorate of potash quoted at \$1.00 and \$0.75 per 100 lbs.



BELTS WILL SLIP - BUT

CLING-SURFACE

WILL STOP IT PERMANENTLY.

CLING-SURFACE is to be applied to the inside of a belt.

It has been so universally satisfactory for the past three years that we can safely guarantee that its use will not only stop all slipping, but that the belts will become soft and pliable, yet firm, if of leather, they will become as soft as calf skin, and also absolutely water-proof, and furthermore we guarantee that the belts can be run sleek, and that the power will be increased so much that in a fair sized plant the cost of the sample can will be earned monthly.

This applies to all belts, leather, cotton, rubber or rope drive, whether new, old, or oily. We will send you a sample can for trial; or, if you prefer, we will advise you further as to its nature.

CLING-SURFACE MFG. CO., 167-172 VIRGINIA ST., BUFFALO, N. Y.

— REPRESENTED IN SALT LAKE BY THE UTAH RUBBER & MFG. CO. —

A Practical Test ...

We asked a man the other day what he thought of our pumps.

"Well," said he, "I've used this pump for twenty years, and it's better than most pumps yet."

The best material, workmanship and patented construction—that's why our pumps wear.

Are you going to buy—Write us for full information and catalogue. All free for the asking.

W. T. GARRATT & CO.,
Pump, Bell, Brass and Machine Works,
138-142 Fremont St., San Francisco, Cal.

MINERALS WANTED



Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities - Pay good prices - Cash

E. C. MOLLER,

538 EAST 80TH STREET,

NEW YORK



The Pulsometer Steam Pump

"THE MINER'S FRIEND"

Often Imitated—Never Equaled

Over 20,000 In Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Railroad, Drainage, Coal Washing, Tackling and for Pumping Black Liquids, etc., its impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

AGENTS

PARK & LACY CO., A. M. HOLTER HOW CO., MITCHELL-LEWIS & STAYES CO.
San Francisco, Cal. Helena, Mont. Portland, Oregon.

CATALOGUE ON APPLICATION
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Pulsometer Steam Pump Co.

133 Greenwich Street, New York City

CHLORIDE OF LIME.

English prime brands \$1.60@1.70,
American, \$1.70@1.80, Continental F.,
\$1.50@1.60 per 100 lbs.

Acids.

Spot business is only fair, while for future delivery a few more contracts have been booked. Oxalic acid has been reduced by the syndicate to 61c., thus the jobbers who have bought heavily at 61c. are now in a predicament.

Quotations are per 100 lb from New York and vicinity as follows: Acetic acid, commercial, No. 8, \$1.40@1.50; muriatic acid, 18°, \$1.10@1.75; 20°, \$1.20@1.87½; 22°, \$1.35@2.26; according to quantity and brand. Nitric acid 36°, \$3.50@4.75, 38°, \$3.75@4.62½; 40°, \$4.00@4.87½; 42°, \$4.62½@5.25. Oxalic acid, \$6.50@8.75. Mixed acids, according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@1.75 for carboys. Chamber acid 50°, in jobbing way, \$11.50@12 per ton f. o. b. factory. Blue vitriol \$3.50@3.62½ for extra grades and \$3.37½ for ordinary.

BRIMSTONE.

The market has eased off on the arrival of 2,400 tons, and spot best unmixed seconds can doubtless be had at \$21 per ton, while futures are obtainable at \$19.50@20 per ton. Thirds are nominal at \$18.50@20. The shipments of brimstone from Sicily to the United States in November, were 7,300 tons.

NITRATE OF SODA.

Buyers and sellers of nitrate of soda are still to far apart to come to any large sales, though about 5,000 bags were sold recently at \$1.52½ per 100 lbs. Sellers are quoting up to \$1.55 for spot, and for futures extending through December, 1899, \$1.55 to \$1.57½ per 100 lbs.

FINANCIAL NOTES.

Average Prices of Metals

in New York per pound from January 1,

1898:	Copper	Tin	Lead	Spelter
January.....	10.99	13.57	3.65	3.95
February.....	11.28	14.08	3.71	4.04
March.....	11.95	14.38	3.72	4.25
April.....	12.14	14.50	3.63	4.26
May.....	12.00	14.52	3.64	4.27
June.....	11.85	15.22	3.72	4.77
July.....	11.63	15.60	3.95	4.66
August.....	11.89	16.53	4.00	4.58
September.....	12.30	16.73	3.99	4.87
October.....	12.41	17.42	3.78	4.95
November.....	12.86	18.30	3.70	5.20
December.....	12.93	18.30	3.76	5.10
Average.....	12.03	15.70	3.73	4.57

Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st,

1899, and for the years 1898 and 1897:	1899	1898	1897
Month.....	Cents.	Cents.	Cents.
January.....	60.80	59.77	64.79
February.....	60.80	59.07	64.67
March.....	60.80	54.90	61.06
April.....	60.80	56.02	61.85
May.....	60.80	56.93	60.12
June.....	60.80	58.01	60.10
July.....	60.80	59.06	59.61
August.....	60.80	59.54	59.19
September.....	60.80	60.58	59.24
October.....	60.80	60.42	57.07
November.....	60.80	60.60	57.01
December.....	60.80	60.42	58.01
Year.....	60.80	59.26	59.79

The statement of the United States Treasury, on Thursday, Feb. 16th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Feb 16.	Change
Gold.....	\$27,551,454	D. \$164,549
Silver.....	8,471,412	D. 908,636
Legal Tenders.....	15,350,555	L. 897,337
Treasury Notes, etc.....	1,987,121	L. 24,006
Totals.....	\$53,372,562	D. \$150,874

Treasury deposits with national bank amounted to \$87,299,096, a decrease of \$261,589 during this week.

Gold and Silver Exports and Imports.

At all United States ports, October 1898, and year from January 1st, 1898 and 1897:

OCTOBER, 1897	1898
Gold—	
Exports.....	\$113,311
Imports.....	\$1,279,936
Excess.....	\$1,166,625
Silver—	
Exports.....	\$5,725,472
Imports.....	\$4,722,527
Excess.....	\$1,002,945
TOTAL MONTHS	
Exports.....	\$12,958,902
Imports.....	\$2,002,464
Excess.....	\$10,956,438
Silver—	
Exports.....	\$4,725,472
Imports.....	\$4,722,527
Excess.....	\$1,002,945

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

FOR SALE!

TWO THIRDS interest in well developed gold mine in Dona Ana County, N. M. See Ad. page 21.

TRHMAIN Two Stamp Steam Mill at Tucson, Arizona 15-H P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREBBLING MINING MACHINERY CO. Kansas City, Mo.

ANTIMONY

BISMUTH

PROSPECTORS having locations of this nature and wishing to sell at once for cash will do well to address with full particulars, E. O. Box 2078, SAN FRANCISCO, CAL.

A VERY valuable, extensive Lead Mining Property in Southwest Virginia. Shafts sunk over 200 feet and actual work has demonstrated richness of veins and purity of ore. Address: GEORGE FRANKIE, Baltimore, Md.

FOR SALE AT A BARGAIN.

A Complete Copper Smelting Plant consisting of two rotation furnaces, one of which has new seamless liner. Plant is complete in every detail. Also an 8-ton Silver Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Inquire of GARDINER, WORTHEN & CO., dealers in Mining and Mill Supplies, Tucson, A. T.

WANTS

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

METALLURGIST and Chemist, ten years experience assaying, ore buying and smelting, at present engaged with large pyritic smelting company in Mexico. desires engagement in the States or British Columbia. Address "W. H. C." Journal Office.

EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of silmy ore or tailings by cyanide a specialty. Address W. V. WATSON, Rly. White Pine Co., Nev.

GOLD mine anywhere in United States, must have at least 1000 feet of development; where coal is not over \$6.00 per ton or wood \$4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working bind; no property considered unless owners are prepared to deposit re-titled check to be forfeited for expenses of engineer if property is not as represented. Address with price and full particulars, J. E. M., Journal Office, 150 Nassau Street, New York, N. Y.

The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain FACTS Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Morgan-Watson Mining and Construction Co.

809-810 New England Building, Cleveland, Ohio

MINES AND STOCKS { We Buy, Sell, Lease and Bond Mines of all kinds.
We Buy, Sell, and Negotiate sales of mining and other stocks.
We furnish machinery to work good mines under special arrangement.
We furnish Capital to develop mines.

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Mint Prices paid Gold and Silver Bullion. Returns made within four hours after receipt.

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THE SHORTEST, QUICKEST AND MOST DIRECT ROUTE TO

MERCUR AND CRIPPLE CREEK

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The Johannesburg of America, New and Wonderful Camp only 45 miles from Salt Lake City, Utah.

CRIPPLE CREEK:

The Greatest Gold Camp in the World, only six years old and two hundred shipping mines in the district.

P. A. MADLBACH,

GENERAL PASSENGER AGENT,

Salt Lake City, Utah

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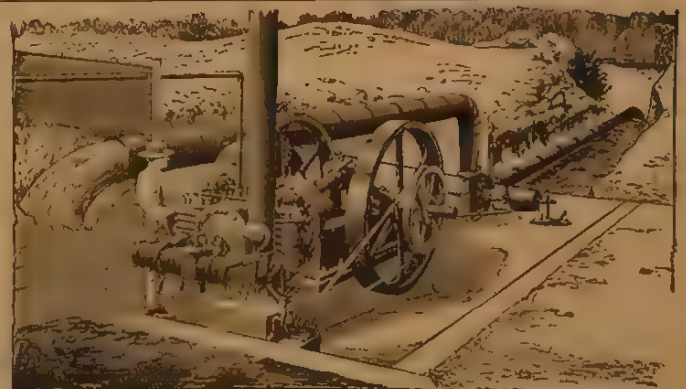
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John Wigmore & Sons Co.

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Mine and Mill Supplies, Iron and Steel

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LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works at the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 800 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 916 Bay St., San Francisco.

MINING STOCK QUOTATIONS

BOSTON			
Adventure	15 55	Isle Royale	65 50
Algonquin	11 50	Mered	9 00
Arcadian	84 00	Mohawk	31 00
Arnold	9 75	Napa Quicksilver	1 00
Atlantic	37 50	Old Colony Min	19 87 1/2
Bonanza	2 00	Old Dominion	38 25
Boston & Mont	275 00	Oscar	12 00
Breece	2 00	Parrott	42 00
Butte & Boston	94 50	Pioneer	5 15
Calumet & Hecla	70 00	Quincy	184 00
Catspa	35	Rhode Island	14 25
Centennial	57 50	Tamarack	230 00
Cochiti	10 50	Tecumseh	5 25
Crescent	30	Victor	5 50
Dominion Prof	116 50	Utah Mining	41 00
Franklin	26 00	Washington Ming	4 00
Gold Dredging	42 50	Winona	16 50
Humboldt	3 88	Wolverine	48 50
ROSSLAND, BRITISH COLUMBIA.			
Alecta	19	Le Roi	7 50
Big Three	15	Lilly May	19 1/2
Butte	04	Mayflower	08
Caledonia Con	05	Monita	19
Colonia	28	Monte Christo	13 1/2
Commander	12	Morning Star	08
Deer Park	18	Mugwump	03
Enterprise	18	Nest Egg	03
Eureka Con	05	Northern Belle	04 1/2
Evening Star	05 1/2	Novelty	04
Georgia	02 1/2	Palo Alto	02
Gertrude	12	Phoenix	02
Good Hope	02	Poorman	12 1/2
Grand Prize	05	Red Mount, View	01
Great Western	03 1/2	Rossld's H'met'ko	05
Hattie Brown	03	Rossland, Red Mt.	14
High Ore	02 1/2	Silverline	05
Iron Mask	07	Silver Bell	05 1/2
Iron Colt	10	St. Elmo	05 1/2
J. L. L.	20	Virginia	43
Josie	45	War Eagle Con	2 38
Josie Mac	46	West Le Roi	28
Jumbo	47	White Bear	07 1/2
SAN FRANCISCO.			
Alta Con	12	Mexican	15
Andes	13	Occidental	52
Becher	21	Ophir	57
Best & Belcher	16	Overman	50
Bullion	10	Ontario	3 50
Caledonia	52	Plymouth	08
Challenge	13	Potosi	23
Chollar	19	Quicksilver	1 25
Confidence	49	Quicksilver pref'd	4 00
Con. Cal. & Va	83	Savage	18

Crown Point	18	Seg. Belcher	20
Deadwood	45	Sierra Nevada	84
Gould & Curry	18	Silver Hill	10
Hale & Norcross	85	Standard	1 75
Homestake	50	Union Con	18
Iron Silver	68	Utah	05
Justice	08	Yellow Jacket	15
COLORADO SPRINGS STOCKS			
Acacia	10 1/2	Isabella	63
Alamo	37	Jack Pot	38
American Con	04 1/2	Lille	07 1/2
Anacoda	52 1/2	Kimberly	07 1/2
Argentum Junata	30 1/2	Magnet Rock	03
Banner	01	Monte	08 1/2
Bob Lee	01 1/2	Mineral Rock	03 1/2
Creede & C. C.	07 1/2	Mountain Beauty	03 1/2
Dante	13 1/2	Mollie Gibson	28
Des Moines	02 1/2	Moon Anchor	03
Elkton Con	1 01	Mount Rosa	28
El Paso	32	New Haven	02 1/2
Emmy Almes	009	Oriole	02
Fanny R.	44	Orphan Bell	07
Favorite	16 1/2	Peoples	04
Findley	16 1/2	Pharmacist	04 1/2
Flower of the W'y	02	Pilgrim C.	04 1/2
Golden Crater	003	Portland	1 74
Golden Fleece	38	Pr. Albert	04 1/2
Gold & Globe	01 1/2	Rattler	02 1/2
Gold King	81	Specimen	03
Gould	08 1/2	Theresa	03 1/2
Granite Hill	02 1/2	Trachyte	03 1/2
Hayden	01 1/2	Union Gold	20
Ingham Con	08 1/2	Work	18 1/2

SALT LAKE CITY			
Alice	75	Joe Bowers	27
Alar	38	Little Pittsburgh	15
Alliance	38	Lower Mammoth	73
Anchor	80	Mammoth	2 00
Backeye	06	Mercur	7 65
Bullion Rock	6 25	Northern Light	49
Cent. Eureka	38 00	Omaha	53 1/2
Chloride Point	1 38	Ontario	6 20
Daisy	64	Overland	2 00
Dalton	01 1/2	Richmond Anna	05
Dalton & Lark	07	Conda	53 1/2
Daly	85	Sacramento	53
Daly West	4 05	Silver King	30 00
Dexter	3 15	Star Consolidated	1 37 1/2
Eagle	08 1/2	Sunbeam	42
Eagle & Blue Bell	1 87 1/2	Swansea	3 67 1/2
Four Aces	48	Swansea	3 67 1/2
Galea	50	So Swansea	1 28
Geyser-Marion	80	Teco	13
Golden Eagle	09 1/2	Utah	55
Grand Central	8 50	Valco	1 40
Homestake	05 1/2	West M't'n P'lcer	37 1/2
Horn Silver	1 15	Young America	50

NEW YORK

Adams Con	08	Japan	6 00
Alamo	05	Jefferson	08
Alcega	30	Julia Consolid	01
American Gold	085	Justian	01
Anacoda Gold	20	King & Pemb	13
Belcher	30	Lacrosse	14
Best & Belcher	42	Lagonda	40
Breece	42	Leadville Cons	03
Brunswick	13	Little Chief	17
Caledonia	50	Mexican	40
Cannon Ball	0035	Mollie Gibson	26
Chollar	24	Mt. Rosa	20
Chrysolite	13	Occidental	61
Comstock Tunnel	04	Old Gold	00 1/2
Comstock Stocks	04	Ontario	25
Comstock Script.	04	Ophir	80
Consolidated Imp	03	Pharmacist	02
Con. Cal. & Va.	1 40	Phoenix	12
Copper Rock	004	Pilgrim	00 1/2
Cr. & Cr. Creek	05	Plymouth	10
Crescent	10	Portland	1 50
Crown Point	15	Potosi	20
Cripple Creek Con	10	Quicksilver	1 75
Deadwood	40	Quicksilver pf'd	8 00
Elkton Cons	85	Rocky Mountain	03
Enterprise	35	Savage	18
Father of Smet	14	Sentinel	00 1/2
Garfield Cons.	13	Sierra Nevada	1 15
Gold Magnet	00 1/2	Small Hope	1 25
Golden Fleece	25	Standard	1 80
Gould & Curry	22	Union Con.	20
Hale & Norcross	1 70	Union	18
Homestake	5 00	Utah Con	12
Horn Silver	1 15	Waldorf	02
Isabella	23	Work	13
Iron Silver	75	Yellow Jacket	22

DENVER STOCK REPORT.

Aetna	004	Keystone	—
Anchorage Leland	87	Little	89
Anacoda	42	Matto	42
Arcadia	04 1/2	Mollie Gibson	29 1/2
Argentum Junata	34	Moon Anchor	1 17
Banner	—	Mt. Rosa	12
Bob Lee	01 1/2	Old Gold	01 1/2
Elkton	1 01	Peoples	01 1/2
El Paso G	15	Pilgrim C.	00 1/2
Enterprise	08	Pine Creek	00 1/2
Fanny R.	43	Portland	1 88
Garfield Grouse	13 1/2	Prince Albert	05
Geo. Washington	003	Republic	05
Golden Eagle	40	Sacramento	05
Gold Con	1 65	Smuggler	24
Gilpin & C C	40	Specimen	—
Gilpin Four	004 1/2	Tamarack	008
Golden Fleece	30	Union Gold	22 1/2
Isabella	1 01	Virginia M	04

Iron Clad	02 1/2	Wheel of Fortune	008 1/2
Jack Pot	40	Work	21 1/2

MEXICO

Name of Company	State	Price
Alamosa	Hidalgo	5
Amistad y Concordia	"	24
Angustias	Guajaluto	280
Arcvalo y Anexas	Hidalgo	170
Asturiana y Anexas	Zacatecas	210
Barradon y Cabras	Durango	150
Bartolome de Medina	Hidalgo	180
Cabrera y An	Zacatecas	30
Candelaria de Pinos	Hidalgo	180
Capasay	Durango	120
Carmen	Hidalgo	400
Catalaniana y San Ram	Tepec	25
Cerro Colorado	Chihuahua	10
Cisco Senores y An	Guajaluto	400
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Guajaluto	40
Esparanza y An	Mexico	1,200
Gualdupo	Guajaluto	180
Huautla	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Maravillas	Hidalgo	100
Palmon	"	150
Palma	Zacatecas	100
Purissima de los Com	"	5
Real del Monte	Hidalgo	900
Refugio y Va	"	8
Restauradora	Durango	8
San Francisco	"	270
S. Fed. Chalcabuites	"	12
San Rafael y Anexas	"	825
do. Free Stock	Hidalgo	400
San Rafael del Oro	"	20
San Maria de la Paz	S. Luis Potosi	650
Sirena	Durango	50
Soledad	Hidalgo	500
Sorpresas	"	250
Trinidad	Guajaluto	40
Tlalcingo	"	27
Union	Hidalgo	250
Zamelahuacan (gold)	Vera Cruz	150
Zona Min de Pozos	Guajaluto	15

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

RICKETTS & BANKS,

Metallurgists & Chemists

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Krogh Manufacturing Company

Successor to San Francisco Tool Co.'s Machine & M'g Dept.

MANUFACTURERS OF AND DEALERS IN

MINING AND PUMPING MACHINERY,

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Krogh 2-Stamp Tripple-Discharge Quartz Mill, of Latest Improved pattern. Rock Breakers, Ore Feeders, Concentrators, Engines and Boilers. Hoisting Rigs to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps. Triple Acting Pumps. Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process. Pipe and Gate Valves. Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

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The Southern California Lumber Co.,

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Chas. Wier Manager, sells

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Mining Timbers a Specialty

Write for Prices

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AIR COMPRESSORS,
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New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

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THE PORTLAND GOLD MINING CO.,

(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1895.

The Ingersoll-Sergeant Drill Co.,

Gentlemen:—We bought two years ago one of the largest

size of the straight line type of Ingersoll-Sergeant Piston

Tollet Compressor.

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over ten 3/4

Eclipse drills. The steam cylinders were connected to an in-

dependent Jet Condenser, for which we are using the mine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

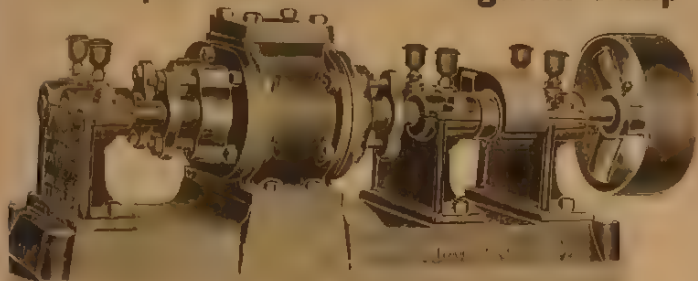
Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

Jas. A. Burns, President

The Improved WONDER Irrigation Pump



We also Build Vertical Style for Mining Purposes.
Write for full particulars and Catalogue.

Wonder Pump Mfg Co.,

KANSAS CITY,
Missouri.

Established 1887

D. Sc. Members American Chemical Society

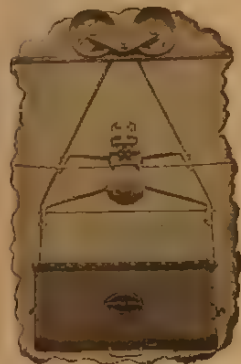
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IS USED ONLY ON THE PATENT

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AND OTHERS, MANUFACTURED BY

THE TRENTON IRON COMPANY,
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ENGINEERS AND CONTRACTORS

AND

Sole Licensees in North America for the Bleichert System

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required on the traction rope, giving
longer service, and saving in
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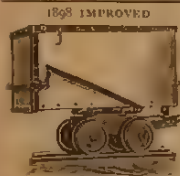
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for Surface and Underground Haulage, Trans-
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The Truax Patent Improved
Automatic Ore Cars

MADE BY

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Send for Catalogue

Manufactured by the
Western Chemical Co. Denver, Col.
For Chlorination, Refining and other
processes. Also Muriatic and Nitric
Acids, Blue Vitriol, Copperas Refined
Sulphate of Soda, Etc.

PATENTED

Jan. 8, 1892. Aug. 27, 1895

July 19, 1898.

In Canada, June 21, 1899.

Randsburg Gold Fields

REACHED VIA

Santa Fe Route

Leave Los Angeles, 10:20 a. m.
Leave San Bernard on 12:10 p. m.
Arrive Randsburg 1:15 p. m.
Leave Randsburg 4:55 p. m.
Arrive Kramer, 5:05 p. m.
Arrive St. Elmo, 6:15 p. m.
Arrive Johannesburg 6:50 p. m.

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Arrive San Bernardino 5:35 a. m.
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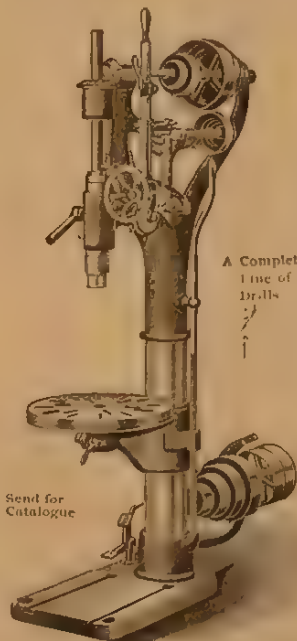
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	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	500,000	\$ 5	\$ 10	Oct 1898	150,000	G
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1898	3,550,000	G
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1898	2,000,000	G
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G, S, L
5	Anaconda	Montana	1,200,000	80,000,000	25	1 25	Nov 1898	8,250,000	G
6	Anchovia Island	Colorado	800,000	800,000	1	01	Nov 1898	168,000	G
7	American Gold	Colorado	800,000	3,000,000	10	09	Oct 1898	362,000	G, S, L
8	Assoiated	Colorado	1,250,000	1,250,000	1	01	Nov 1898	70,000	G
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1899	780,000	G
10	Aurora	Michigan	100,000	2,600,000	25	50	May 1898	750,000	G
11	Bald Butte	Montana	250,000	250,000	1	03	Oct 1898	627,118	G, S
12	Big Six	Colorado	500,000	500,000	1	00½	May 1898	1,000	G, S
13	Boaton & Montana	Montana	150,000	3,750,000	25	5 00	Nov 1898	9,125,000	G, S
14	Breece	Colorado	200,000	5,000,000	25	05	Dec 1898	30,000	G
15	Bullion Berk and Champion	Utah	100,000	1,000,000	10	10	Dec 1898	2,350,000	G, S
16	Bunker Hill and Sullivan	Idaho	800,000	3,000,000	10	07	Nov 1898	570,000	S, L
17	Carihuo	British Col.	800,000	800,000	1	02	Aug 1898	238,005	G
18	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,850,000	G
19	Centennial Eureka	Utah	30,000	1,500,000	50	50	Dec 1898	2,500,000	S, L
20	Central Lead	Missouri	10,000	1,000,000	100	50	Nov 1898	77,000	L
21	Champion	California	84,000	840,000	10	25	April 1898	296,200	G
22	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165,000	G
23	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G, S
24	Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,595,000	G, S, C
25	Crowned King	Arizona	800,000	6,000,000	10	02	Oct 1898	208,000	G, S, L
26	Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G
27	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S, L
28	Dulch	California	150,000	1,500,000	10	04½	Feb 1898	39,000	G
29	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	Oct 1898	836,061	G, S
30	El Paso	Colorado	850,000	850,000	1	01	Jan 1898	12,093	G, S
31	Empire State	Idaho	75,000	750,000	10	10	Nov 1898	35,000	G
32	Enterprise	Colorado	500,000	500,000	1	05	Sept 1898	900,000	S, L
33	Fern	British Col.	200,000	200,000	1	05	Jan 1898	110,000	G
34	Geyser-Marion	Utah	800,000	1,500,000	5	02	Sept 1898	90,000	G
35	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Oct 1898	120,000	G
36	Golden Cycle	Colorado	200,000	1,000,000	5	02½	Oct 1898	155,000	G
37	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G, S
38	Golden Reward	S. Dakota	1,000,000	1,000,000	15	15	Feb 1898	155,000	G
39	Grand Central	Utah	250,000	250,000	1	12½	Dec 1898	218,750	G, S, C, L
40	Halls Mines Ltd.	British Col.	250,000	1,250,000	5	25	May 1898	160,000	G
41	Highland	S. Dakota	100,000	10,000,000	100	20	Nov 1898	3,764,718	G
42	Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1898	117,000	G
43	Homestake	S. Dakota	125,000	12,500,000	100	50	Nov 1898	7,118,750	G
44	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	782,252	S
45	Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210,000	S, L
46	Idaho	British Col.	500,000	500,000	1	05	May 1898	261,000	G
47	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G
48	Iron Mountain	Montana	500,000	5,000,000	10	02	Apr 1898	507,500	S
49	Isabella	Colorado	2,250,000	2,250,000	1	00½	June 1897	270,000	G
50	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	180,000	G
51	Kennedy	California	100,000	10,000,000	100	48	Aug 1898	1,790,000	S, L
52	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G
53	Lillie	Colorado	1,000,000	1,000,000	1	01	Oct 1898	148,110	G
54	Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735,000	L
55	Modoc	Colorado	500,000	500,000	1	01	Dec 1898	110,000	G
56	Montana Ltd	Montana	800,000	3,300,000	5	05½	May 1898	2,997,557	G, S
57	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Oct 1898	800,000	G
58	Morning Star	California	2,400	240,000	100	5 00	June 1898	688,600	G
59	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G
60	Mercur	Utah	200,000	5,000,000	25	12½	Nov 1898	1,218,000	G
61	Mammoth	Utah	400,000	10,000,000	25	05	Oct 1898	1,390,000	G, S, C, L
62	Moon Anchor Gold	Colorado	800,000	800,000	1	07½	Nov 1898	261,000	G
63	Mountain Copper	California	250,000	6,250,000	25	62½	Sept 1898	98,750	G
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct. 1898	945,000	S, G
65	Napa	California	100,000	700,000	7	20	Oct 1898	950,000	Q
66	New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	80,000	Q
67	North Star	California	200,000	2,000,000	10	25	Nov 1898	500,000	G
68	Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,642,500	S, L
69	Osceola	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552,500	C
70	Parrot	Montana	230,000	2,300,000	10	30	Oct 1898	2,069,898	C
71	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Oct 1898	48,500	G
72	Pioneer	California	100,000	1,000,000	10	12½	Dec 1898	50,000	G
73	Portland	Colorado	3,000,000	3,000,000	1	02	Nov 1898	2,250,080	G, S
74	Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	47,000	G
75	Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120,000	C
76	Rambler-Carihuo	British Col.	1,000,000	1,000,000	1	02	April 1897	40,000	G
77	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G
78	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	287,500	S, L
79	Republic	Washington	1,000,000	1,000,000	1	03	Dec 1898	90,000	G
80	Sacramento	Utah	1,000,000	5,000,000	5	00½	Nov 1898	67,000	G
81	Santa Rosalia	California	100,000	100,000	1	10	Feb. 1898	125,000	G, S
82	Small Hope Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S
83	South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S, L
84	Standard	California	200,000	20,000,000	100	10	Aug 1898	5,674,940	G, S
85	St. Joseph	Missouri	30,000	3,000,000	10	1 50	Sept 1898	2,747,000	L
86	Silver King	Utah	150,000	3,000,000	20	25	Dec 1898	1,800,000	S, L, G
87	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	G
88	Smuggler	Colorado	1,000,000	1,000,000	1	01	Oct 1898	1,075,000	S, L, Z
89	Swansea	Utah	100,000	500,000	5	05	Dec 1898	138,500	S, L
90	Tamarack	Michigan	80,000	1,500,000	15	3 00	June 1898	5,331,000	C
91	Victor	Colorado	200,000	1,000,000	5	50	Dec 1898	1,155,000	G
92	Vindicator	Colorado	1,500,000	1,500,000	1	05	Oct 1898	180,500	G
93	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48,580	G
94	War Eagle	British Col.	2,000,000	1,000,000	1	01½	Oct 1898	230,000	G
95	Wolverine	Michigan	60,000	2,500,000	25	1 00	Oct 1898	60,000	C
96	White Water	British Col.	125,000	1,250,000	5	32	April 1898	194,000	G
97	Yellow Aster	California	100,000	1,000,000	10	10	Oct 1898	148,789	G

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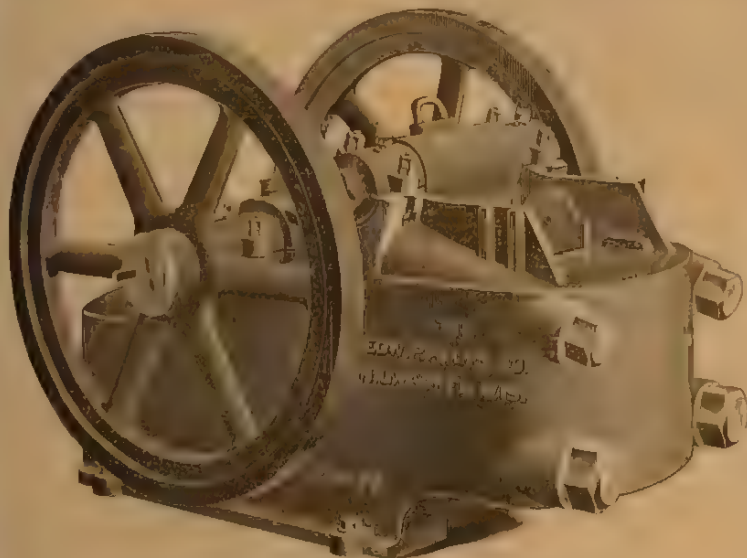
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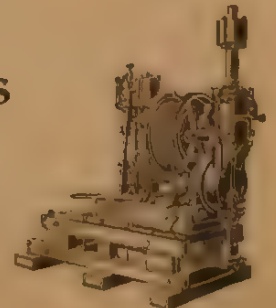
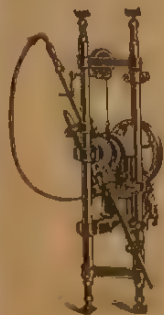
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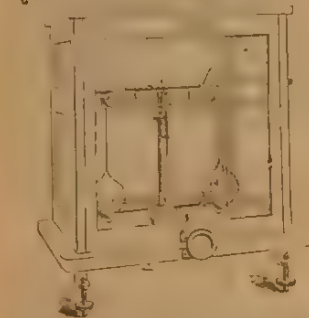
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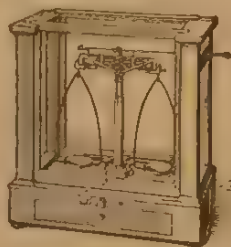
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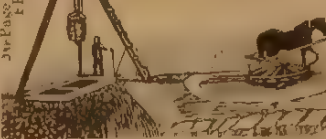
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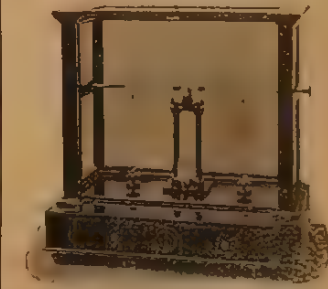
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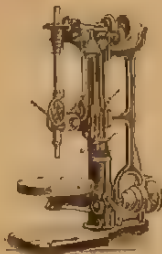
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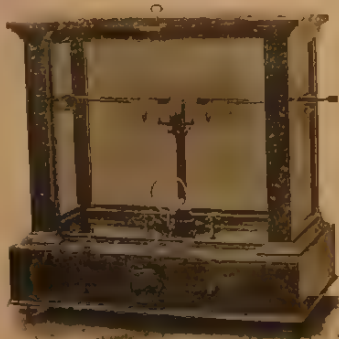
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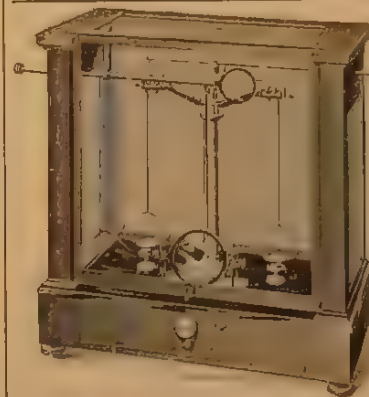
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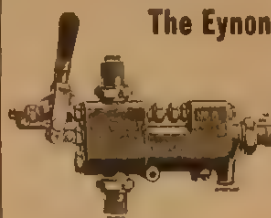
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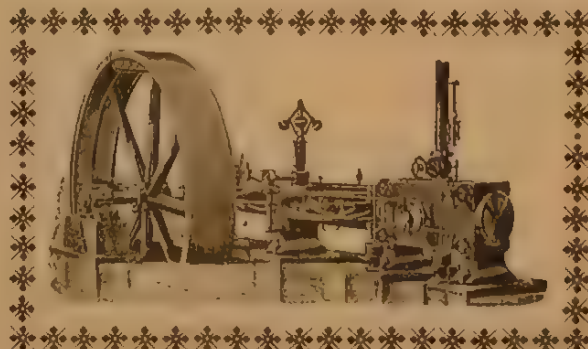
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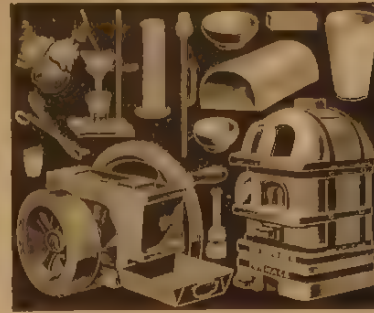
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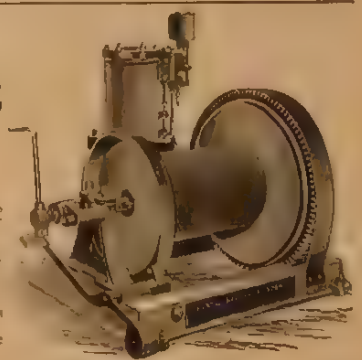
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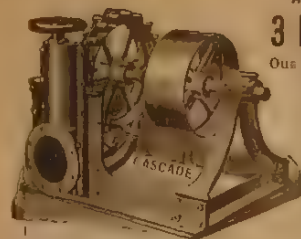


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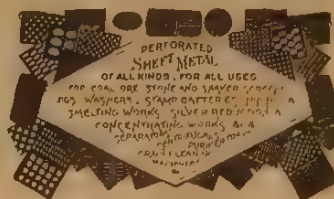


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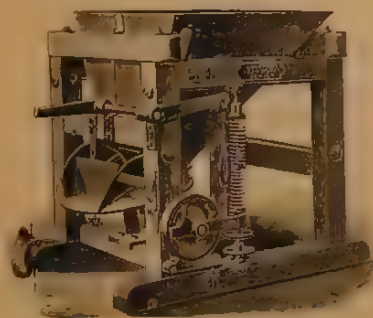
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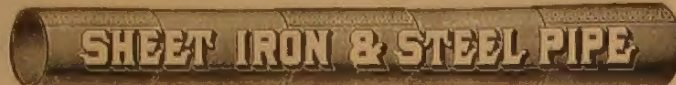
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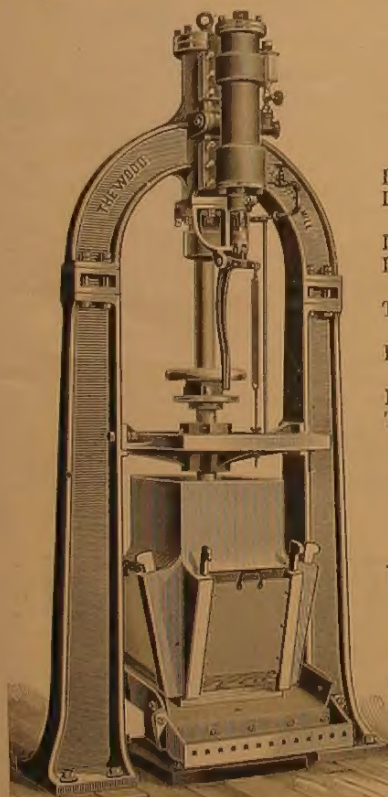
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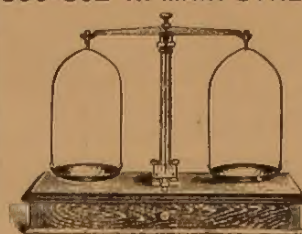
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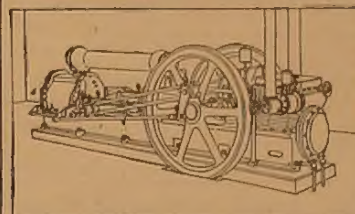
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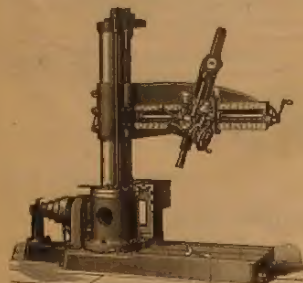
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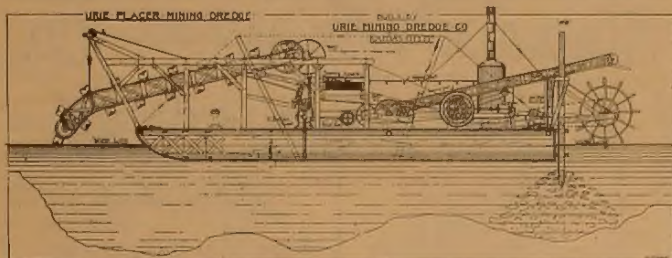
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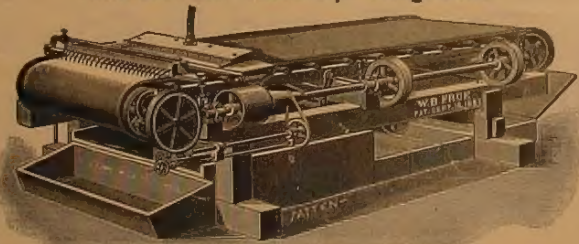
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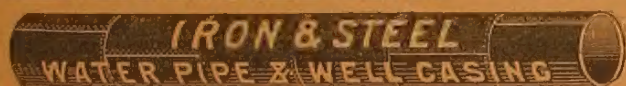
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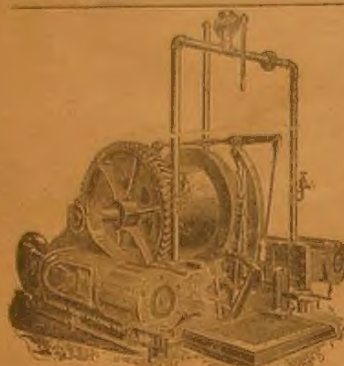
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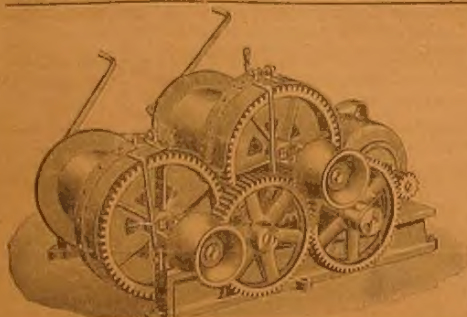
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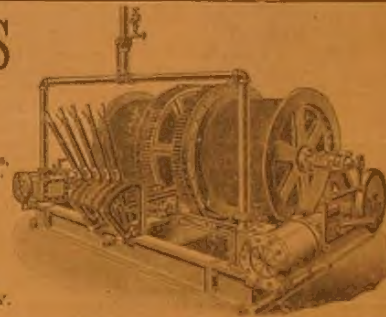
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